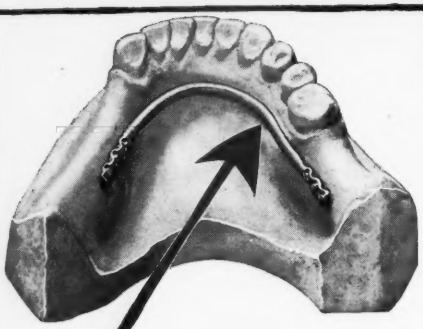
THE DENTAL DIGEST

SEPTEMBER, 1927
VOL. XXXIII, No. 9

GEORGE WOOD CLAPP, D.D.S., EDITOR
PUBLISHED BY
THE DENTISTS' SUPPLY COMPANY OF NEW YORK
220 WEST 42ND STREET NEW YORK, N.Y.



Did you ever use a Ney Lingual Bar?

— A die forged staggard retention with a strong segment where other bars are weak.

— A retention that holds like grim death, but occupies little space in the vulcanite.

— May be annealed and easily adapted, then toughened by slow cooling.

— Shaped in cross section to combine maximum strength with minimum bulk.

—Three Regular sizes, to meet the requirements of any symmetrical arch.

— Four sizes, Extended, Right or Left, for any asymmetrical arch, to save time and prevent mutilation of the bar in adaptation, when more teeth are absent upon one side than upon the other.

1. Regular, Small, $2.00
2. Regular, Med. $2.25
3. Regular, Large, $2.50
4L. Left Extended, Med. $2.75
4R. Right Ext'ded, Med. $2.75
5L. Left Ext'ded, Large, $3.00
5R. Right Extended, Large, $3.00

THE J. M. NEY COMPANY
HARTFORD, CONNECTICUT, U. S. A.

THE
DENTAL DIGEST

Vol. XXXIII SEPTEMBER, 1927 No. 9

The Edentulous and Semi-Edentulous Ridge from the Radiographic Viewpoint*

By Howard H. Jackson, D.D.S., Detroit, Michigan

From the viewpoint of the patient the problems of denture construction are few and simple. All that he demands is that the restoration appear natural, function properly and be permanent in tissue adaptation. He hopes also that there will be a minimum of discomfort during use. It is with the questions of determining the permanence of tissue adaptation and comfort that we shall deal. On the other hand, the problems of the prosthodontist are many, one of which is to solve the question of unbalanced dentures and the effect that the lack of balance has in producing recession or shrinkage.

A study of dry specimens, together with a study of radiograms of these same specimens and also of similar conditions from actual cases in practice, will present a different view of this subject from that usually held. This study cannot but lead to the conclusion that no matter how carefully balance has been obtained—in fact, even though there is an entire absence of trauma or uneven stress—recession may occur, not necessarily because of faulty technic or construction, but because the supporting structures are faulty and not fit for the use they are expected to give. I do not say that trauma cannot produce recession, because it does, but many instances of recession that in the past have been classified as an end-result of lack of balance or trauma are due primarily to destructive changes within the supporting tissues and structures.

Heretofore it has been necessary to depend largely upon digital examinations and experience in judging whether or not a ridge is favorable for denture construction. We believe that we are to present an added method of increased accuracy in differentiating favorable and unfavorable types, not only in post-operative cases, but in pre-operative as well. We believe it will be of value also in the determination of localized areas of irritation, which very often cause grief not only to the patient but also to the operator. These conditions can be determined by correct radiographic interpretations.

Before considering the changes of the ridge formations we should

* Read before the Eighth Annual Meeting of the National Society of Denture Prosthetists, Philadelphia, Pa., August 20, 1926.

review the characteristics which differentiates a good radiogram from those that are very frequently presented. The distinguishing marks of a good radiogram are a minimum of distortion of the length and the breadth of the parts under observation, and the soft-tissue detail must be visible. A sufficient number of exposures should be made to cover all the areas of both arches, including the retro-molar spaces and the tuberosities. Minimized distortion requires that the angulation be determined as correctly as possible, and that the films be not bent in as far as the surfaces upon which the parts in question are registered. These factors are the fundamentals of good radiography. Another essential is that the examiner must know radiographic anatomy so that he may differentiate between normal and abnormal conditions. In interpretation one must always remember that the radiographic evidence is alway less in extent and apparent severity than the condition is in reality.

The ideal pre-operative condition of the teeth and their supporting structures will show the septa with their crests intact and of the proper shape for their position. The first step in destructive influences is incipient cervical pericementitis, which is revealed radiographically by pinching of the crests and a thickening or enlargement of the pericemental membrane about the cervix. From this point we note three types of reaction to the irritating factors. The first type results in a recession of the septa, with but little or no infiltration into the cancellous structures. This may progress to the apical portions of the roots without showing a definite infiltration. A condition such as this is favorable for retention of the teeth, if given intelligent treatment, without the danger of loss of a satisfactory ridge form.

The second type of recession shows a breaking through of the crests and an infiltration into the cancellous structures, which is apparent by the decreased density of these structures. However, there is normal cancellous structural formation bordering the infiltrated area and in some cases the cancellous structures appear more dense, as if there was an effort to wall off the invading influences. This type, as a rule, while more destructive than the first, is amenable to correct treatment.

The third type is very destructive and apparently requires early and radical treatment if there is to be any hope of permanent ridge form and comfort in use. After the first evidences of cervical pericementitis are observed, there will be noticed a breaking down of the crests of the septa and an infiltration extending into the cancellous structures comprising the body of the septum. There is no apparent line of demarcation between the infiltrated and normal areas, as in the second type. This class of destructive influence is not always accompanied by a corresponding loss of the dura, for we sometimes see infiltration extending well into the medial portion of the septa, with the dura extending to

the cervix and the crests but slightly broken down. This infiltrative process can and frequently does extend beyond the apices of the teeth. The destructive influences remain after the teeth have been removed, unless special attention has been given by the surgeon to remove the affected structures. This residual infection, in turn, produces continual shrinkage of the ridge and irritation of the soft tissues through the expulsion of spicula.

Another type of destructive influence on ridge formation is that produced by marginal sacs such as we find in so-called *pyorrheal pockets.* These sacs contain bacteria such as are found in periapical sacs. Retention of these sacs will apparently produce areas of decreased density in the cortical layer to such an extent that in many instances the cancellous structures are exposed. This is almost synonymous with localized discomforts beneath a denture. Correct interpretation preceding the removal of the teeth will prevent this particular factor of irritation.

The soft-tissue detail will reveal the presence of spicula within the gingivae that would otherwise be lost to view if these tissues were not shown. We wish to call attention to the peculiarity that the presence of spicula within the soft tissues of persons in apparently normal health is usually accompanied by no discomfort and the spicula are usually absorbed before they reach the surface. In these cases spicula are generally found before complete regeneration of the cortical layer has occurred. On the other hand, spicula within the soft tissues of patients below normal, even though the surgery may have been performed some time previously, will mean areas of localized irritation that cannot be overcome without surgical interference. Localized areas of irritation are distinguished by a roughening of the crest in an otherwise excellent cortical layer.

The radiographic appearance of the desired lower ridge shows a thin, dense cortical layer which has no areas of decreased density within it. This is accompanied by a generous cancellous formation to furnish the necessary support. In the upper arch the cortical layer is usually less evident, and even though we can determine a reasonably smooth or even ridge, we can consider the cortical layer as desirable or favorable. These conditions are but seldom encountered, however, and are usually found to be the result of the first type of recession. Using this condition as the ideal, we can demonstrate all degrees of variation from it until an entire absence of the cortical layer is noted. The final stage is distinguished by the loss of the thin white line upon the crest and the serrated ridge and exposed unjoined ends of the cancellous structures within the soft tissues. Such conditions are usually found to be associated with pitting or infiltration of the cortical layer bordering the area and are from the second or third types of recession or from retained marginal sacs.

The second or limited infiltrative type may be treated successfully, as a rule, by mild surgical interference. The tissues can be retracted surgically or by other means until a sufficient view of the affected areas is provided. Then by the use of chisels or small curets the sacs and infiltrated bony structures are removed. This procedure has been very successful in the indicated cases, where the operator is competent and trained.

At the present time the only method of combating the third or severely destructive type of infiltration is intelligent surgical interference. The retraction of the soft tissues will reveal to the surgeon pitting or infiltration of the outer plates, and he must proceed below the line of infiltration. I am not an advocate of nor do I believe in radical surgery without just cause, but, in the lower arch especially, definite infiltration of the cortical layer should automatically indicate removal of these conditions. The lower cortex should present a smooth, uninfiltrated surface. The upper arch shows minute foramina, which must not be confused with infiltrative conditions. The infiltrative condition should be recognized as early as possible in order that the patient may have as satisfactory a ridge form as can be obtained. Persistence in retention of the teeth in the destructive infiltrative type will eventually result in loss of all supporting structures and loosening of the teeth. This is followed by recession of the ridge after the soft tissues have healed, which will apparently respond to no other measures than surgical interference.

A careful consideration of the foregoing will reveal that certain conditions of the septa must be reckoned with from a prosthodontic viewpoint as well as from those which are usually considered. Further study will lead inevitably to the conclusion that the cancellous structures are not maintained by mechanical factors and influence alone, even though they may have been laid in response to them. Observation of cases referred by physicians as well as dentists cannot but impress one with the fact that there are factors apparently systemic in nature and about which we at present are entirely in the dark, but which influence, if they do not largely control, the quality of the cancellous structures and cortical layers which form the foundations upon which the success or failure of denture construction depends.

SUMMARY

1. The intra-oral radiogram affords a greater knowledge of the conditions of the crests of the ridges in edentulous cases and of the crests of the septa in pre-operative cases than a digital examination affords.

2. A study of the pre-operative case must be made with special view

to the condition of the crests of the septa and of the cancellous structures in the bodies of the septa.

3. There are, radiographically, three types of recession of the septa. The first is non-infiltrative and is favorable for further treatment and retention of the teeth without interference with a satisfactory ridge form. The second is infiltrative in character, but is localized in its effects and may under proper treatment be converted into a serviceable ridge form. The third is severely destructive in nature and is unfavorable for proper ridge form, if allowed to persist.

4. Loss of ridge form will occur if the bony structures are not favorable, even though perfect balance has been obtained in construction of the dentures.

5. The radiographic interpretation of areas such as usually contain marginal sacs is necessary to prevent localized areas of irritation beneath dentures.

6. Examination of the intra-oral radiogram in edentulous cases will usually reveal generalized or localized areas of decreased density of the cortical layer, which will indicate the cause of discomfort.

7. The soft-tissue detail must be apparent radiographically in order to reveal the presence of spicula, which under certain conditions are factors in local or general irritation.

8. The solution of this problem of obtaining satisfactory ridge form lies in correct interpretation of the radiogram and intelligent treatment of the conditions revealed.

The author wishes to acknowledge his indebtedness to the Faculty of the Detroit College of Medicine for their aid in obtaining the dry specimens used in demonstrating the destructive and irritating conditions discussed.

ILLUSTRATIONS

Fig. 1

Fig. 2

Fig. 1

The pointed appearance of the crests of the septa is shown, and the pinching of them, which is the first indication of disturbance involving them.

Fig. 2

The crest between the centrals is flattened and slightly receded. This is the first step in recession of the septa. Notice that there is no infiltration of the body of the septum.

Fig. 3

Fig. 4

Fig. 3

Extensive recession of the septa without infiltration of the bodies, except in the one on the right. If the teeth are firm, this case is favorable for retention of the teeth, provided the pockets are eradicated.

Fig. 4

This case is much less favorable than that in Fig. 3, as one can readily observe the infiltration of the septa where the crests are broken.

Fig. 5

The teeth are loose, but the infiltration is noted extending beyond their apices. In order to obtain a satisfactory ridge formation, the infiltrative areas should be removed.

Fig. 6

This is the most difficult type to treat successfully and to have a satisfactory result with dentures. Note that the dura extends to the cervices, but that the crests are broken and the infiltrative area extends well to the apical areas. This type requires early removal of the teeth and curettage of the infiltrated cancellous structures and cortical layers.

Fig. 7

Fig. 8

Fig. 7

An upper posterior region showing the flattened crests typical of *bell-crowned* teeth. This is the most favorable type.

Fig. 8

A good cortical layer in a semi-edentulous case.

Fig. 9

Fig. 10

Fig. 9

A ridge such as this will result in localized irritation and recession unless the area is thoroughly curetted to remove the infiltrated bony structures.

Fig. 10

A localized infiltrative area in the upper arch. The cancellous structures are greatly decreased in number and density, and the cortical layers would be pitted.

Fig. 11

Fig. 12

Fig. 11

Localized infiltration in the lower arch. This infiltrative area requires removal.

Fig. 12

The severe infiltrative type. Note that the dura extends well to the cervices, but that the infiltrative area extends well into the medial portions of the septa. This type of case requires early radical measures or there will be a constant recession and irritation beneath the dentures.

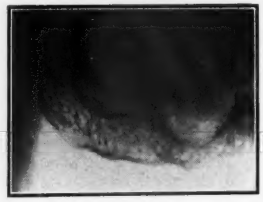


Fig. 13

Fig. 14

Fig. 13

A good cortical layer in the upper arch. This is a more definite registration than we usually observe.

Fig. 14

An average cortical layer registration.

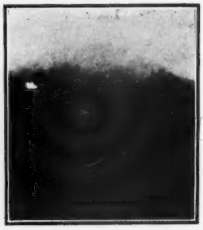


Fig. 15

Fig. 16

Fig. 15

Note the infiltration of the ridge in this incisor area. Such a registration usually means local irritation and loss of adaptation, unless extraction is comparatively recent.

Fig. 16

A good cortical layer in the lower arch.

Fig. 17

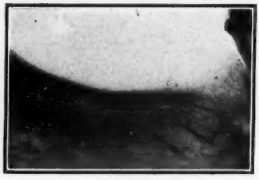


Fig. 18

Fig. 17

A poor registration of the cortical layer, showing its marked thinness and the serrated condition of the ridge. This would be accompanied by recession.

Fig. 18

A thin, knife-edged formation is noted in the radiogram. However, the limitations of printing interfere with its reproduction.

Fig. 19

Fig. 20

Fig. 19

The knife-edged formation is obliterated. This is from the same patient as Fig. 12, but made three years later. This patient has never had satisfactory use of her dentures and is troubled with constant recession and irritation.

Fig. 20

There is a pocket on the mesial of the molar, as can be observed. Such a pocket usually contains a marginal sac formation, which, if retained, results in softening of the bony structures.

Fig. 21

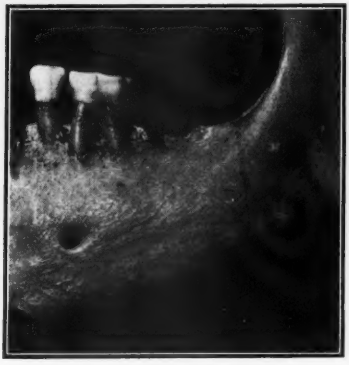


Fig. 22

Figs. 21-22

Occlusal and lateral views of a dry specimen. Note the breaking through of the cortical layers in the septa. The radiographic registration would be similar to Fig. 11. How would one expect to place a tissue-borne appliance on such a layer and not have shrinkage result?

Fig. 23

Fig. 24

Figs. 23-24

Occlusal and lateral views of a dry specimen. Note the absence of a firm cortical layer in the areas about the molars.

Fig. 25

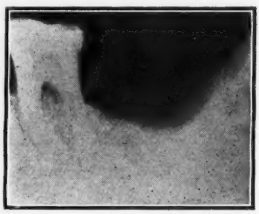


Fig. 26

Fig. 25

Radiogram of the dry specimen in the region immediately anterior to the two molars. Note the extensive infiltration into the cancellous structures.

Fig. 26

Radiographic examination of the space immediately posterior to the single molar of the dry specimen in Figs. 23-24. The registration is not so definite as is usually presented in dry specimens because of the use of material to simulate soft tissues such as are present in the mouth. Note the infiltration of the cortical layer. Such an area would result in a localized irritation.

Fig. 27

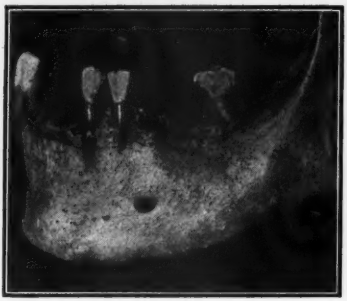


Fig. 28

Figs. 27-28

Occlusal and lateral views of a dry specimen. Note the sharp spines, due to the cancellous structures remaining after the cortical layer has been destroyed by what is believed to be bacterial influence. Such a ridge would result in loss of tissue adaptation, and there would be constant spicular formation.

Fig. 29

Radiogram of the space in the dry specimen where the second bicuspid is absent. Note the infiltration of the cancellous structures.

Fig. 30

The same specimen as in Fig. 29, from the opposite side. Note the infiltration and loss of the cortical layer. Compare with the occlusal views and note that there is a definite predisposition to shrinkage because of the absence of a cortical layer.

Fig. 31

Fig. 32

Figs. 31-32

Occlusal and lateral views of an upper arch from a dry specimen. Note the dense cortical layer except in the cuspid region.

Fig. 33

The registration of the cortical layer in the dry specimen of Fig. 31. The cuspid region shows an area of decreased density, which would indicate the loss of the cortical layer and an infiltration into the cancellous structures, which is readily observed. Such an area would result in local irritation and would require curettage.

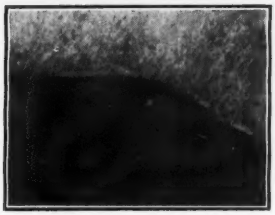


Fig. 34
Registration of a good cortical layer in the upper arch.

Fig. 35

Registration of an upper cortical layer nine months after the removal of the teeth and the insertion of dentures. This dense layer is unusual, not only in regard to thickness but also for the period of time elapsed. It shows what is possible, however, in favorable cases.

608 Stroh Building.

Some of the Requirements for a Curriculum in Dental Technology

By George L. Roth, Hartford, Conn.
Editor, *The Dental Forum.*

During the past decade the dental laboratories of the United States and Canada have increased in number from 1,000 to over 2,500; the number of persons engaged from less than 5,000 to very nearly 10,000; and the pecuniary total of the business to not less than $18,000,000 a year. The men who pursue this calling have ceased to view it as a sort of unacknowledged necessity to be exploited merely for profit and have begun to evince a strong faith in the social value of the service they render.

The last few years have also witnessed a marked change in the attitude of the dental profession. This has manifested itself particularly in regard to an old problem that is sometimes spoken of as the *education of the laboratory man.* In fact, whether or not some measure of education may be desirable has almost ceased to be a debatable issue. The idea that *something* should be done has taken root, and it has now become a question of *what* must be done.

Not a little confusion prevails as to the exact scope of such an education, and as to its proper objective. It is not generally recognized that instead of one class of workers there are really two to be considered. On the one hand, there is a class of about 6,000 bench operatives working under the direction of dental laboratory proprietors or of men employed by them in a supervisory capacity. On the other hand, there are the men engaged in directing them, the great majority of whom are small laboratory proprietors with one or two assistants, together with a fairly large number without any assistants. This class includes also the experts of the vocation, men whose skill and experience are of such a high order that little if any active supervision is necessary, and who are usually employed in laboratories, and to a limited extent in the offices of dentists, for the more exacting kinds of work.

It is not easy to draw a sharp dividing line between these two classes, but there is one, and it may be found in the relationship between *skill* and *intelligence.* The manual operations of members of the first group are under the immediate control of minds other than their own, and their prime educational need is greater dexterity rather than scientific information. The members of the second group are guided by their own technical judgment, and their educational problem is considerably more than a matter of developing mere manual skill.

This has been made inevitable by the evolution of dentistry itself and by the conditions under which laboratory work is done today. The dentist cannot give instructions for every detail of the technic for every

case; time alone prevents him from doing more than furnishing specifications as to the "form and substance" of the completed restoration. He cannot supervise the application of technic because the work is done at a distance from his office. And the majority of dentists could do neither of these things, even if the obstacles of time and distance did not intervene, because of the complexity of modern dentistry. The "biological" and the "mechanical" divisions of dental practice have become too highly specialized for both of them to be mastered except by men who are unusually gifted. The average dentist often fails in prognosis, as well as in operative preparation, and has little conception of the growing intricacy of laboratory technic. No matter how capable he may be as a dental surgeon, his experience is seldom sufficent for him either to give detailed instructions for laboratory procedure or to supervise its execution intelligently. These have become the task of the dental technician. Upon him has fallen the responsibility of controlling the processes of construction for two-thirds of the prosthetic work that is done today. It is he who must interpret professional specifications that are often vague and inconsistent and be capable of modifying laboratory technic to remedy defects in preparatory work. It is imperative for him to have trained judgment and a mind well stored with accurate information, if the services of the dental profession to the public are to measure up to the ideals of modern dentistry.

At present, the technician acquires knowledge in a haphazard manner. He is like a seaman steering a course without having been instructed in the science of navigation. His information is gleaned from empirical observation, from other laboratory technicians, from contact with individual dentists, from occasional clinics, demonstrations, or "postgraduate courses," and, if he reads, from dental textbooks that are usually obsolete, or from the dental journals. His knowledge varies enormously in extent, and although the dental technician is to be heartily congratulated for what he does know rather than treated with contumely for what he does not, his judgment is not equal, as a rule, to the responsibilities that have been placed upon his shoulders by the dental profession.

Serving many dentists, his knowledge of the principles and practice of prosthetics should exceed that of any individual dentist. This means more than a casual acquaintance with physiology, dental anatomy, histology and pathology. Further, to understand thoroughly the handling of materials and apparatus, he must know a great deal more than any dentist about chemistry, applied physics and metallurgy. It is needless to point out that such a body of theoretical and practical knowledge could be imparted to him only through the medium of a well conceived curriculum—one which, in the absence of a better term, we may call a curriculum in *dental technology*. Furthermore, it should

be taught by a dental college, and the only way to define his responsibility satisfactorily, to confer authority upon his technical judgment and to give free rein to his initiative—within the proper limits of his vocation and its ultimate subordination to the dental surgeon—would be to confer upon him an academic status. It would be ridiculous, of course, to think of a doctorate in connection with his calling, but he should receive at least a certificate or a diploma to testify to his competence as a dental technician and to crown his success in taking a course of instruction that would occupy not less than two years. It would not be necessary for every dental college to institute such a curriculum. For a long time to come, in all probability, one university at the Eastern seaboard, one in Chicago, and one upon the Pacific Coast, with another possibility in the Middle West, would be ample to meet the requirements of the entire country.

This brings up the matter of entrance requirements. What sort of men should be admitted for a course in dental technology? Waiving for the present discussion, the obvious necessity of some previous schooling, and the no less obvious question of how much, it seems to the writer that nobody should be admitted who was not an experienced bench workman, and who could not produce certain specific credentials. The experience of the applicant should be tested by a severe practical examination, before a board of technicians and dentists, in most of the fundamental processes of laboratory technic. The credentials for a dental mechanic should consist of satisfactory references from employers for a period of at least three years; those for a laboratory proprietor should consist of references from not less than three dentists, whom he had served continuously for at least three years.

Although primarily a selective entrance test, examinations of this sort could also be made a powerful agency for promoting the manual training of the dental mechanic. They should be held in dental colleges all over the country, regardless of whether they had instituted the curriculum we have suggested, grades obtained in these examinations being accepted for entrance requirements by any college with a course in dental technology. Further, the privilege of being examined should be granted to anyone who could produce the necessary credentials, regardless of any immediate intention to register as a student of dental technology. This would establish an authoritative criterion for manual skill. It would confer a status upon every dental mechanic who could obtain a passing grade in any of these examinations that would enable him to gauge his actual proficiency and would be an advantage in seeking employment. It would be highly beneficial also to the better laboratory organizations. Naturally those laboratories that employed none but graded mechanics would ultimately enjoy greater confidence on the part of the dental profession. On the other hand, those laboratory proprietors

who gave their employees the best opportunities for varied experience and the development of their skill would inevitably attract the most intelligent and the most capable dental mechanics—to the betterment of the service they rendered to the dental profession.

In suggesting this plan there is no intention to decry the value of possible extension classes for dental laboratory workers in any university with a dental department. Such classes would be highly beneficial and not only would serve to broaden the viewpoint of those who entered them and to aid dental laboratory proprietors in training their employees, but would assist in the preparation of dental mechanics, or technicians, who intended ultimately to take a course in dental technology. The idea that the writer wishes to convey is that a severe practical examination in a dental college not only would meet the entrance requirements for such a course, but also would help to solve the problem of manual training for the dental mechanic.

32 Robbin Road.

[MAKING PROPHYLAXIS POPULAR]

The apathy of the dental profession, taken as a whole, toward the subject of the practical application of oral prophylaxis has its basis in the hopelessness of the task as they understand its principles. Once let them comprehend the ease with which an intelligent operation for the promotion of health of the teeth produces results, the whole body of the dental profession will enter joyfully into the practice of preventive dentistry.

—STILLMAN.

Oral Surgery In Practice

By James L. Zemsky, D.D.S., New York, N. Y.
Attending Surgeon, Department of Oral Surgery; Chief of Clinic and Director, Surgical Periodontia Department, Midtown Hospital, New York

(*Continued from August*)

FRACTURES

¶164. Before the treatment of a fracture is undertaken, a correct diagnosis is essential. A roentgenographic study of the case is of inestimable value. (See Figs. 46-47.)

¶165. In treating fractures, two points must be borne in mind—avoidance of deformity and restoration of normal function.

¶166. The most important step in the treatment of fractures in which displacement of fragments has occurred is reduction and fixation. When a fracture involves the temporomandibular articulation, movement should be encouraged to prevent adhesions, which often result in ankylosis.

¶167. Direct introduction into bone fragments of metal screws, silver wires and other metallic bodies is to be avoided, since they invariably give rise to extensive necrosis.

Baker Splint

Wiring of Fractured Jaws (Eby-Ivy Method)

¶168. Fixation is satisfactorily secured by the various methods of

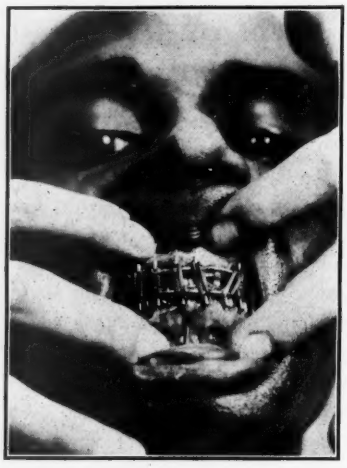


Fig. 142

The Baker splint in position. The amount of force and its direction are easily regulated by elastic bands, which are slipped over the vertical projections attached to the wire arches adapted to the labio-buccal surfaces of the teeth and attached to them by means of these wires. (See ¶168.)

wiring, among which Winter's modified Baker anchorage and Eby's eyelets are very effective. (See Figs. 142-148.)

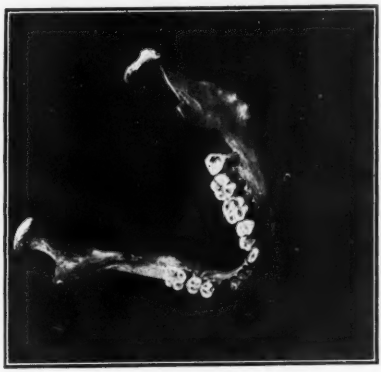


Fig. 143

First step in wiring fractured jaws. A loop of No. 23 copper wire is inserted between the teeth, the eyelet being allowed to remain labially at the neck of the teeth. (See ¶168.)

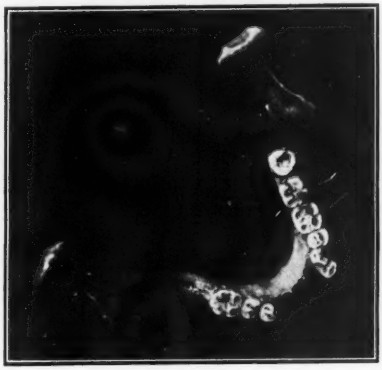


Fig. 144

Second step in wiring fractured jaws. The end of the wire is passed linguo-labially through the intradental spaces. (See ¶168.)

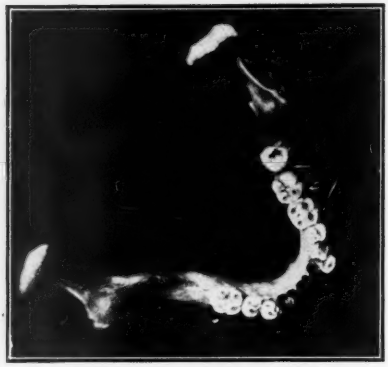


Fig. 145

Third step in wiring fractured jaws. Both ends of the wire are encircling the necks of the teeth and are ready to be tightened around them. (See ¶168.)

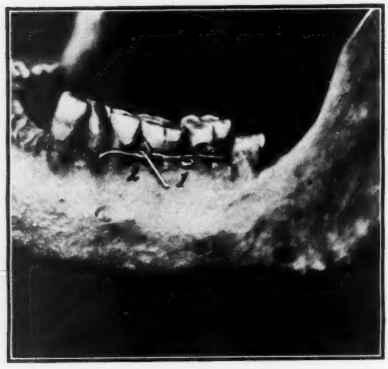


Fig. 146

Fourth step in wiring fractured jaws. The eyelet (1) is *nearer* the alveolar ridge. The end wires encircling the necks of the teeth are tightened (2), so that they are nearer the occlusal plane. (See ¶168.)

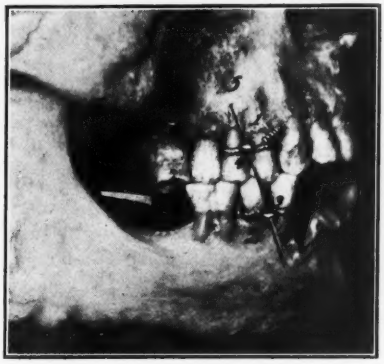


Fig. 147

Photograph showing both maxillary (1) and mandibular (2) wires applied. The positions of the eyelets (3-4) are indicated by the needle (5) that passes through them. (See ¶168.)

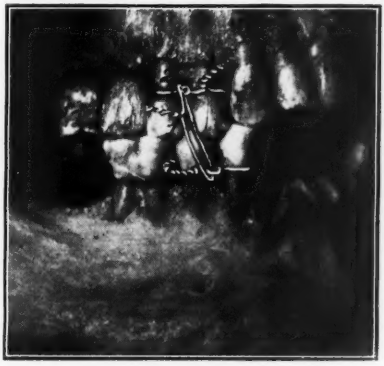


Fig. 148

Final step in wiring. An orthodontic ligature wire (1) passes through the eyelets (2-3) and thus the maxillae are brought together. (See ¶168.)

335 East 149th Street.

(*To be continued*)

Developments in Indirect Inlay Technic

By Louis I. Abelson, D.D.S., New York, N. Y.

(*Continued from August*)

Toilet of Wax Pattern Before Investing

Procure two wide-mouthed bottles both alike, about 1 inch in diameter at the open end and about 2 inches deep, one to contain alcohol and the other water, both at room temperature (Fig. 25). In the cork stopper of each, provide a wax core that will hold the sprue-former with the pattern attached. Mount the pattern on the stopper, set it into the bottle of alcohol, invert to submerge the pattern and shake up. This removes all traces of the oil used in lubricating the die and does not reduce the temperature by evaporation because the alcohol in mass is at

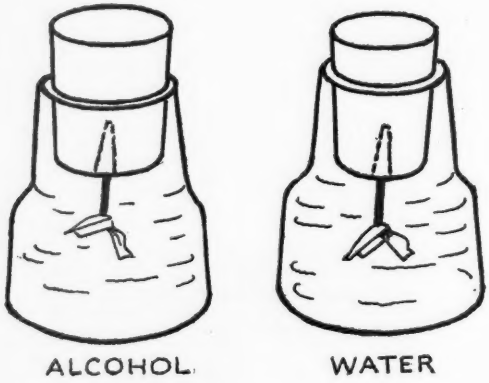


Fig. 25
Bottles used for washing patterns.

room temperature. After the removal of the stopper from the alcohol set the same stopper into the bottle containing the water to wash off the alcohol. In this way we eliminate the chilling of the wax by the evaporation of the alcohol brushed over the pattern or the marring of fine edges and smooth surfaces by the use of cleansers or diluted investments.

Investing the Pattern

Mount the sprue and pattern on an oiled crucible-former and prepare a clean casting ring.

The equipment for investing consists of:

(1) A fine sable-hair brush.
(2) A large rubber bowl.
(3) A hard vulcanite spatula bent to conform to the shape of the bowl.
(4) Investment compound.
(5) A vessel containing clean, room-temperature water.
(6) A watch with a second hand.
(7) A syringe to discharge water in quantity or by drops.

At the present time the profession is swamped with numerous types of investment compound used in various technics. Suffice it to say that it would be folly to use high-heat investments with low-heat pattern elimination technics, and vice versa. Whatever procedure is followed, we must by all means enlist the aid of all appliances, steps and materials that go with that process, for deviations from such rules involve the danger of failure.

The technic to be described from now on will be one involving a high-heat investment, slow elimination of pattern, and casting in a cold mould. The investment used and described is a preparation containing graphite, silica and plaster, the last being present in a much smaller proportion than is prevalent in low-heat investments.

Weigh the necessary proportions of water and investment. Wash the bowl with room-temperature water to moisten the pores of the rubber bowl and dry with a towel. This step prevents the caking of investment around the bowl and the absorption of water of crystallization from the mix by the blotter action of a dry rubber bowl.

Pour the investment and water into the bowl and spatulate thoroughly and briskly for one full minute. While spatulating, rotate the bowl and, after every turn of the bowl, scrape the mix from the side into the bottom, thus avoiding stagnation of any part of the investment. After one minute of spatulation, rotate the bowl and tap it on the bench for two full minutes. This will drive all the bubbles out of the investment to the surface, where the tapping breaks them.

We now come to the step of painting the pattern, a thicker mix being more desirable next to the pattern for increased strength and decreased porosity of that part of the mould, and incidentally for greater smoothness in the casting. This may be accomplished by double investing, a process involving the mixing of a heavier investment as a paint-on and another to fill the casting ring. For inlays and other small patterns we may accomplish the same end with a single mix as follows:

After the investment has been weighed, spatulated and tapped, place a towel against the lip of the rubber bowl and bend the bowl so that a quantity of the investment will come in contact with the towel; hold it

that way for two seconds and then set the bowl down. We shall find that a mass of investment has collected below the rim, very porous and useless for our purpose at the lip (Fig. 26-A), but gradually blending into a thick, creamy and velvety batch of investment with a meniscus where the more fluid contents of the bowl have retreated (Fig. 26-B).

With the sable brush moistened and squeezed out between the fingers, take up some of this velvety mix, apply it at one corner of the pattern and push it ahead onto the pattern, never lifting it off to carry or drop it at some other spot. If more is needed, add it to the previous paint-on and continue pushing it ahead until the entire pattern is covered.

Fig. 26. Investment mix.
A—Porous portion, not used. B—Velvety, creamy investment used as the paint-on.

Under no circumstances start at two or more points and risk enclosing an air space when they join. This applies also to dropping the investment into grooves and corners and not working into them. When a sufficient amount has been built up over the pattern, place the casting ring over the crucible-former and fill it to a slight excess. Place it aside to set for about one-half to three-quarters of an hour before attempting to separate for burning out.

Before beginning the paint-on, it is imperative to see that the

wax pattern is dry or we shall defeat our purpose by diluting the investment with the water, resulting in a poor, thin mix next to the pattern and giving a rough, *sugary* or bubbly surface. The same result will be obtained also if the brush is too moist.

When hardened, hold it in the left hand by the crucible-former, with the casting ring suspended below and over the palm of the hand. A slight tap is sufficient to dislodge it. The crucible-formers with a wax center are best removed by rotating slightly to loosen them. Before removing the sprue wire, remove the excess and with a moist cloth wipe off all sediment and adhering portions of investment. Now either heat the sprue wire in a very small flame or catch it with warmed pliers and pull it out. Do this with the casting ring upside down, in order to avoid dropping particles down the sprue hole.

Elimination of Wax Pattern

In the process of burning out the pattern we should strive at all times to get a baking heat and never a direct flame on any part of the investment. This is particularly true for the first warming up, for at that time the investment is subject to great changes if abused by careless or haphazard manipulation. A most excellent method is to use an enclosed baking apparatus either gas or electrically controlled. This type of device prevents direct contact of the flame with the investment and brings about an even heating atmosphere.

A simpler yet equally efficient method may be followed by the use of an asbestos plate over a low Bunsen flame for the initial warming, to drive off the moisture, and a small coarse-meshed spider placed between the casting ring and the asbestos tray, to create an additional avenue of escape for the steam and vapors generated. If this is not done, water will accumulate under the ring and every now and then a sputter will be heard.

At first the investment has a grayish appearance, but as the moisture is driven off the surface becomes paler until it is entirely white, denoting thorough drying. Now replace the asbestos plate with a piece of cast-iron plate and raise the flame full. After several minutes the wax will begin to volatilize and fumes will rise from the top of the casting ring. If there is sufficient wax, these fumes may ignite, producing a characteristic yellow carbon flame. When the flame has disappeared, turn off the gas. Enough heat will remain in the metal plate and casting ring to continue the final dissipation of the wax. However, if there are not enough of the fumes to ignite, continue heating until the fumes come in the maximum quantity and shut off the gas so that the stored heat will continue to expel any remaining wax. The mould is now set aside to cool slowly, preferably under cover, and, upon reaching room temperature, is ready for casting.

Cracking and roughening of moulds are due to numerous causes:

(1) Use of a low-heat investment with this technic.
(2) Improper proportioning of water and investment.
(3) Improper mixing.
(4) Heating before the mould has set.
(5) Heating too rapidly.
(6) Cooling too rapidly.
(7) Heating the mould on a reverse type of apparatus—low-heat apparatus for high-heat mould, or vice versa.
(8) Contact of the investment with the flame.
(9) Overheating the mould.
(10) Prolonged heating of the mould.

Casting Technic

Of the various types of casting apparatus we find that three are in general use, the suction machine falling into disfavor more and more as time goes on.

In certain parts of this country the centrifugal machine has become very popular and, although it is a very successful device, the majority of operators seem to prefer pressure apparatus. Dr. Taggart was the first to introduce this type to the profession and during all these years it has gained in admirers, so much so that others have devised machines with modifications apparently simplifying this principle.

In the casting process with pressure machines we must strive to use as little pressure as is consistent with good castings, about 5 or 6 pounds being sufficient for average inlays and 8 or 9 pounds for larger or thinner castings. An excessive pressure has a tendency to produce ragged feather extensions, while insufficient compression will produce incomplete castings with round, polished margins instead of the fine, knife-edged finish.

The metals used vary with the function of the restoration. In abutments a high-fusing gold such as a 5⅞ platinized gold is indicated, while for simple tooth restorations a 2% platinized gold or 22-karat will suffice. For shoeing, use a correspondingly harder metal. Several metallurgical houses market a number of metals for inlays, each having definite properties, that can be relied upon for our problems. It is inadvisable to alloy our own metals because of our inability to control certain discrepancies and obtain similar alloys every time. The use of scrap metals should be discouraged because of their unknown composition. For best results, always add fresh, unused metal to the old, cleaned buttons.

The melting apparatus should be a rapid one to avoid overheating the metal and the mould, the former resulting in a disturbed balance

of the alloys and the latter possibly in a cracked mould. An oxygen and illuminating gas apparatus is simple in construction, very rapid and efficient, and melts the metal so rapidly that the casting can be made just as it liquefies and before the mould can heat up.

When ready to cast, set the pressure gauge at the point required and have at hand a clean charcoal block with a small depression in the center, as well as tweezers, borax, slate pencil, sun glasses and flask tongs.

Mount the flask on the platform of the casting machine and proceed to melt the gold on the charcoal block to remove any impurities that may be adherent to the molten gold. Let the metal cool until it has just solidified and transfer it to the side of the crucible of the flask. Melt the gold and watch it run to the sprue hole, by which time the entire mass is sufficiently melted, and quickly bring down the plunger and baffle plate.

If the gold is placed over the sprue hole, there is no guide for the removal of the heat, the general tendency being to overheat the gold in order to make sure that the button is uniformly melted.

After cooling, wash off all the adhering investment with hot water, soap and brush, and then pickle in acid.

In examining the casting for globules and other imperfections, use the jeweler's loop and view the casting from all angles. Quite often globules on a cavo-surface are overlooked because there is no contrasting background, but if examined sidewise we shall find them standing aloft. These must be removed completely, because, while they may mar the die and permit the inlay to be seated, in the tooth they will behave quite differently.

The inlay, wrapped in tissue paper, is set in the die and given a few blows in a moldine swage. Grind off the excess contact and sprue extensions. Make sure that the acid has been well neutralized, as any trace would be sufficient to affect the cementing medium.

It is preferable not to make any adjustments other than these, because fine corrections in articulation and contact point are best accomplished in the mouth, after which we may polish the inlay on the die.

Wash the inlay with soap and hot water, wipe clean with alcohol and replace in the mouth for final examination and burnishing. Remove it, wash again, wipe with alcohol and set aside for cementation.

The cavity is thoroughly washed, dried and lined as previously explained. Should bleeding start from the approximal gingival tissues, we find ourselves perplexed and embarrassed, especially if we attempt to stop it by pressure with cotton pledgets or by the use of caustics. This delicate tissue will not tolerate violent handling, but if we permit the patient to close his mouth and rest for a moment and then rinse once or twice with cold water, we shall find that the hemorrhage has

ceased, and unless we again injudiciously abrade the tissue, the oozing will not recur and our mental composure will be regained.

At this stage our greatest reward is received when we behold the creation by our own hands of a restoration which functionally replaces what nature has been robbed of, preserves that which disease has not yet destroyed, and defends the surrounding tissues from the ravages of forces continually tending to disrupt and undermine that which nature has so graciously bestowed upon us.

310 West 72nd Street.

Resolution Adopted by the American Society of Orthodontists

It has come to the attention of the American Society of Orthodontists that quite recently a bill designated as Assembly Bill 1214 has been introduced into the Legislature of the State of California which provides for the creation of a new profession to be known as the profession of orthodontia. The bill further provides that this profession shall be under the jurisdiction of the State Board of Medical Examiners and subject to their examinations.

Orthodontia is now established and practiced as a specialty of dentistry and is so recognized by all the leading universities of this country and by the dental examining boards of all of the States of the Union.

The American Society of Orthodontists has been importuned to record an expression regarding the revolutionary change which would be brought about by the enactment of such a law as that proposed by Assembly Bill 1214 referred to.

Be It Therefore Resolved: That the American Society of Orthodontists, in regular Assembly, this 4th day of May, 1927, does hereby record its unanimous and unqualified disapproval of such vicious and indefensible legislation, such legislation in the opinion of its members being detrimental to the best interests and welfare of the public at large.

Be It Further Resolved: That a copy of these resolutions, together with a copy of the aforementioned bill, be sent to the dental press, to the Secretary of the American Dental Association, and to the Secretaries of each of the dental societies of all of the States of the Union.

PERCY HOWE'S LETTERS
In Collaboration with "Brother Bill"

Ninth Letter

Dr. Howe writes of the effect of diet-deficiencies on arch form.

My dear Doctor:

Now that we have seen something of the effect of deficient diet upon

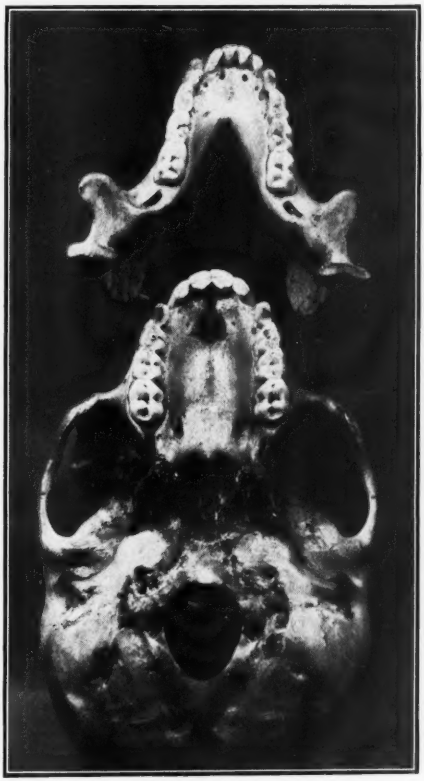


Fig. 37

Dental arches of a monkey on normal diet. For comparison with arches in illustrations that follow, note the width between the first molars as compared with the antero-posterior length.

retardation of the cranial and facial development, let us study the effect of diet deficiencies upon the dental arches.

Fig. 37 shows again the dental arches of a monkey upon a normal,

well-balanced diet, as was shown in Fig. 27. They were formerly shown in relation to the growth of the body in general and of the face in particular. Now please note the proportions of the mandibular arch. Observe that it is fairly wide between the right and left first molars, as compared with the antero-posterior length from the incisor point to a line drawn across behind the second molars. From the picture you prob-

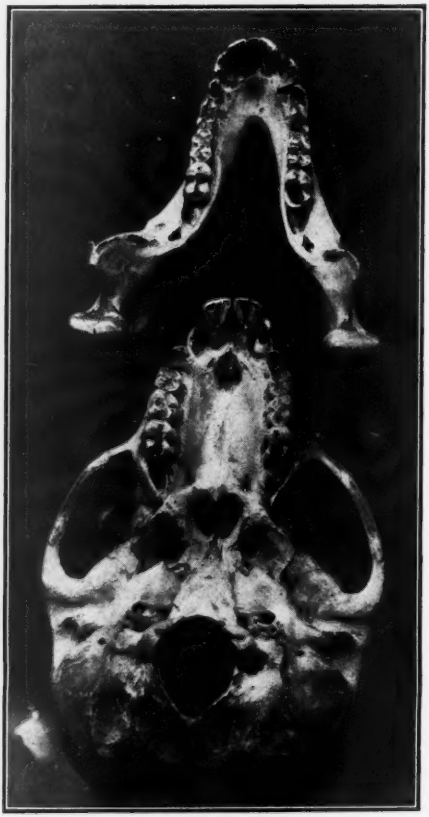


Fig. 38 (same as Fig. 20)

Dental arches of a monkey which had for 15 months a diet containing an excess of cereals with a deficiency of green food. Note change in arch form, especially in the mandibular arch, as compared with Fig. 37.

ably cannot tell much about the quality of bone which supports the teeth, but I assure you that it is excellent.

Fig. 38 shows the dental arches of a monkey which was fed for

Fig. 39

Lateral view of the arches shown in Fig. 38. The change from the usual form of profile can be seen by comparing this with Fig. 40.

fifteen months upon a diet containing an excess of proteins and cereals and a deficiency of vegetables and green food. This picture was shown as Fig. 20, but attention was then called especially to the decay of the molars. Now I want to call your attention to the change in arch form as compared with the normal. Perhaps you can note that change most easily in the mandibular arch, which you can see is narrower in proportion to its antero-posterior length than that in Fig. 37. A side view of this skull, with the teeth occluded, is shown in Fig. 39, and

Fig. 40

Face form in profile and occlusion of a monkey on normal diet.

Fig. 41

Mandibular arch of a monkey quite different from the one in Fig. 37, the result of a slight deficiency of Vitamin C over a long period of time. While there has been great change in form, there has been no destruction of bone.

you will see by comparison with Fig. 40 that the upper cuspids are as far forward as the incisors in the normal case. So marked is this change of form that some one who saw this skull thought it to be a different species from that shown in Fig. 40. But the species is the same; the only known cause of a difference in form is a difference in diet.

Fig. 41 shows another mandibular arch, which is quite different in form from the mandibular arch in Fig. 37. This is the result of a slight deficiency of Vitamin C over a long period of time. It is such

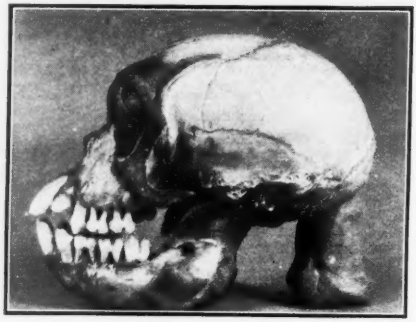


Fig. 42

Occlusion in one monkey on deficient diet. The teeth have here been articulated by the facets which the maxillary cuspids wore upon the opposing teeth. The animal was unable to masticate food in anything like the usual way.

a deficiency as probably occurs in many human diets. Such a diet in a growing child might not give the maxillary bones strength enough to resist the inward pull of the powerful cheek muscles of mastication, and the bicuspids and molars might be forced toward the median line, with the result that the anteriors would be driven forward. Please observe that, in spite of the change in form, the result of the deficiency has not destroyed any of the bone. The condyles and the coronoids are perfect in form and size. There is no decay in the teeth.

Fig. 42 shows the results of diet-deficiency and jaw formation on the articulation of the teeth. During the latter part of his life this monkey's teeth did not occlude well enough to permit him to masticate

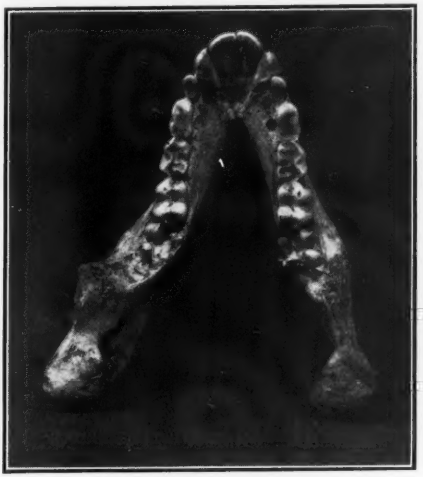


Fig. 43

Mandibular arch of a monkey who suffered from a greater deficiency of Vitamin C than the one whose mandible is seen in Fig. 41. While the distortion of arch form is perhaps not so great as that shown in Fig. 41, there is considerable disturbance of bone formation, so that the condyles are merely club-shaped masses.

his food, and it was necessary to cut it into very small pieces so that he could chew it a little. After the skull was cleaned, the teeth were placed in occlusion by the guidance of the facets which the upper cuspids had worn in the lower cuspids on both sides. This is probably a fairly close approximation of the occlusion in life. Proper mastication of food is quite impossible in this relation.

Fig. 43 shows the mandibular arch of a monkey who suffered from a greater deficiency of Vitamin C than the one whose mandible is shown in Fig. 41. This deficiency was long continued. It did not cause decay

Fig. 44

Portion of the mandible of a monkey whose diet was severely deficient in Vitamin C. Note the great destruction of bone. Compare with Fig. 43. This animal was unable to shed the deciduous incisors to make room for the permanent teeth.

Fig. 45

Occlusal view of the maxillary arch of a monkey which was subjected for two years to repeated severe deficiencies of Vitamin C and the basic mineral salts, with intervening periods of normal diet and partial recovery. At his sudden death in the cage not a whole bone nor a sound organ was found in the body.

of the teeth, but the quality of the bone was affected and the form of the condyles and coronoid processes was practically destroyed. The condyles are merely club-shaped masses of bone.

Fig. 44 shows a portion of the mandible of a monkey whose diet was severely deficient in Vitamin C. Perhaps the first thing to notice in this mandible is the great destruction of bone. The quality of the bone is affected much more here than in Fig. 43, so that the ramus on the left side is a mere mass of bone, while that on the right side completely disintegrated when the specimen was carefully cleaned. Some of the teeth were loose and could not be retained in position. Note also that the monkey had been unable to shed the deciduous lower incisors to make room for the permanent anterior teeth, and both are in place.

Fig. 45 shows an occlusal view of the maxillary arch of a monkey which had been subjected for two years to repeated severe deficiencies of Vitamin C and the basic mineral elements, with intervening periods of normal diet and partial recovery. At the time of its death there was not a whole bone nor a sound organ in the body. The bones of the hard palate had disintegrated so that it was impossible to determine exactly the positions of the alveolar ridges, but these were assembled in what appeared to be about the correct positions and are held there by masses of wax, which show in the picture.

Now let us examine some records of the dental arch conditions of children and then compare the results with the dental arches of these monkeys. Dr. Cross* is authority for the statement that about 90% of the children who have come to Forsyth present some form of dental irregularity. That means that not more than 10% of these children have arches comparable to the monkey arches in Fig. 37, whereas practically all monkeys not in captivity and free to choose their own diet have such arches. Perhaps half of these irregularities do not interfere with the practical use of the mouth and probably not seriously with its cleanliness, although many of them would be benefited by the services of an orthodontist. The other half of these irregularities are of undoubted practical significance, as to either cleanliness or function. It is quite impossible for Forsyth to do for these children all that it would like, but for about 30% of all its patients it undertakes to correct the positions of the deciduous teeth with the idea of making it possible for the permanent teeth to erupt in proper positions.

Perhaps it does not mean very much to you when I write that 90% of the children have some degree of irregularity, but if I were to write that more than 30,000 out of the 34,000 children who are annually patients here have imperfect dental arches, you would begin to get some

*Dr. Harold DeW. Cross has been the Director of The Forsyth Dental Infirmary since its opening in 1915. He is familiar with the case histories of perhaps 175,000 children and is probably better fitted to form an intelligent judgment in a matter of this sort than any man in America.

idea of the prevalence of arch deformities. And if I write that for more than 10,000 of these children annually the deformity is so serious that it is necessary to correct the deciduous arch in order that the permanent arch may be of proper form, you will begin to understand how very numerous are the serious arch deformities. Please bear in mind that Forsyth has been compelled to limit its new patients to children not over six years old. If it were to take all the poor children who are in need of dental service, the figures would be much greater.

The crux of the situation lies in the fact that after years of careful observation Dr. Cross has been forced to the conclusion that these arch deformities are the result of nutritional deficiencies. If I were to put this into my own words, I should say that the jaws of these children are

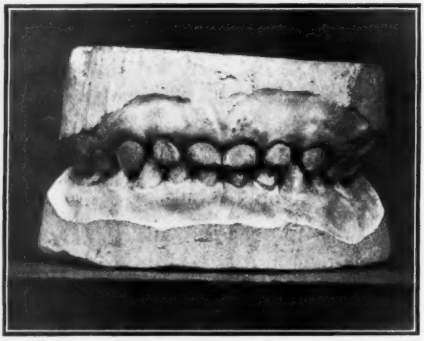


Fig. 46 (same as Fig. 33)

Practically perfect arch development at the age of five years. (Courtesy of E. S. Ulsaver, D.D.S.)

very much like the jaws of the monkeys on deficient diet, because the children suffered from diet-deficiencies during their formative periods.

Of course you are familiar with the appearance of deformed dental arches, but you do not often get the chance to see a perfect deciduous arch. I showed as Fig. 33 and repeat here as Fig. 46 the picture of one which Dr. Bogue, ten years ago, thought to be perfect. The boy was then five years old. I called your attention to the fact that the deciduous anteriors, upper and lower, had spread spontaneously to provide space for the eruption of the permanent teeth in proper positions. The boy is now fifteen. Fig. 47 shows his permanent arches. Fig. 48 shows a survey of the two arches by Frederick Lester Stanton, D.D.S., and you will see that the deciduous mandibular arch forms the anterior portion of the permanent mandibular arch, and that the two maxillary

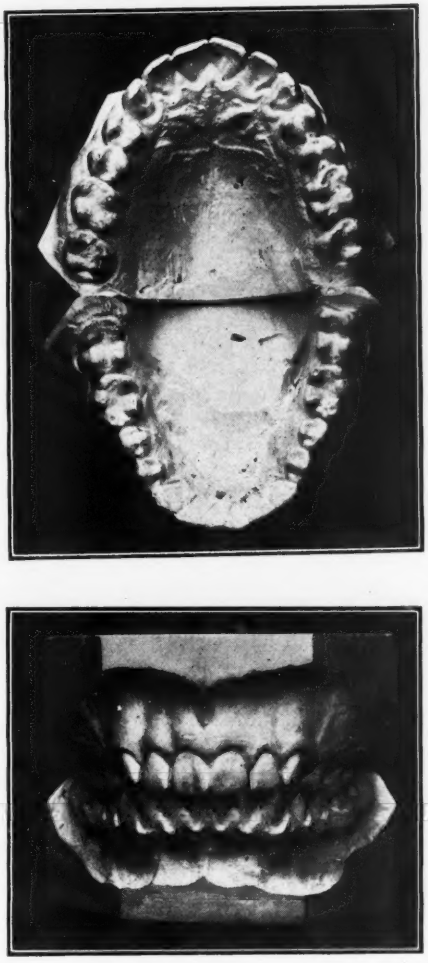


Fig. 47

Arches at the age of fifteen of the same boy whose arches, at the age of five, are shown in Fig. 46. (Courtesy of Ashley Howes, D.D.S.)

arches are very similar in form. Fig. 49 is a picture of the boy, freckles and all, as he is today. There are no signs of physical deficiencies, but there have been minor diet-deficiencies in the past. He has been readily susceptible to "colds" and has suffered to quite an extent from caries, his teeth being what is known as *soft*. Since the long-established deficiencies in his diet were corrected about a year ago, his general physical

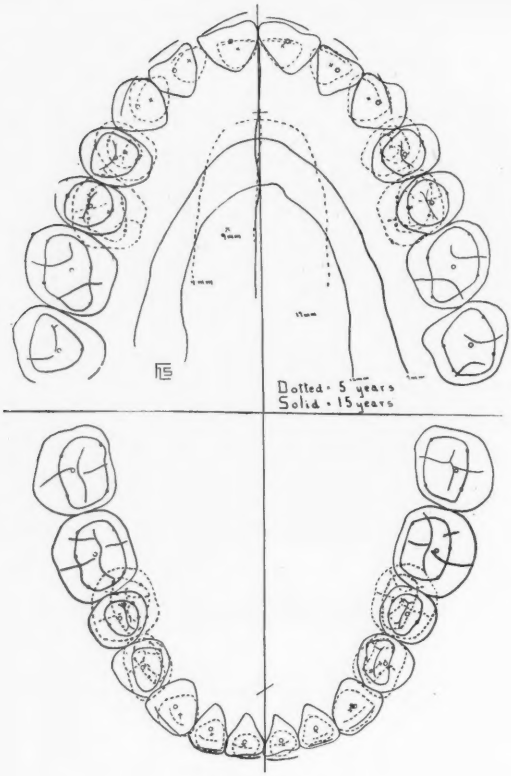


Fig. 48

Surveys of arches of a boy at the ages of five and 15 years. The dotted outlines show the position of the deciduous teeth, the solid outlines the position of the permanent teeth. (Courtesy of Frederick Lester Stanton, D.D.S.)

condition has greatly improved. He is now growing more rapidly, goes skating without a hat and comes home with icicles in his hair, and no trace of a cold! As no new cavities have formed in the teeth since the correction of his diet, it is not known whether the teeth are still soft.

The following figures, which are shown by the courtesy of Dr. Stanton, illustrate conditions that are of special interest in this connection, because they demonstrate the power of the body to correct, by its own efforts, deficiencies in the dental arches, at least at certain ages.

Fig. 50 shows a survey of the mandibular arch of a girl of rather less than average stature at the age of six. There was not sufficient

Fig. 49

The boy whose arches are shown in Figs. 46-47, as he is today at the age of fifteen.

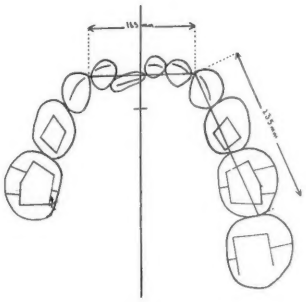


Fig. 50

Survey of a mandibular arch at the age of six. The significance of the brackets is explained in the text. (Courtesy of Frederick Lester Stanton, D.D.S.)

Fig. 51

A—Cast of a lad of rather less than full stature at the age of five years. The anteriors did not spread apart as they should. B—During the next five years the arch did not widen in the premolar region and there was not enough room for the permanent incisors in the most desirable alignment. They were therefore pushed into protruded positions. (Courtesy of Frederick Lester Stanton, D.D.S.)

room for the mandibular permanent incisors in proper positions. The space between the mandibular cuspids should be equal to the combined width of one mandibular cuspid and two deciduous molars, as shown in the bracket on the right. In this case that distance should be 23.5 mm., but it is only 16.5 mm. The permanent incisors are irregular.

Fig. 51 shows, above, the maxillary cast of a boy five years of age and, below, a cast at 10 years of age. The boy was unable to expand the arches in the premolar region and thus permit the permanent maxil-

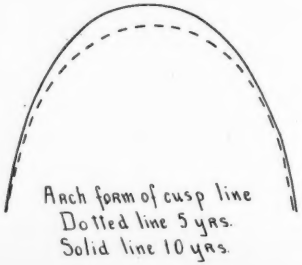


Fig. 52
(Courtesy of Frederick Lester Stanton, D.D.S.)

lary incisors to obtain their normal positions. The permanent incisors were therefore pushed somewhat forward and a mild form of protrusion resulted.

Fig. 52 shows the outline of the cusp locations of the casts shown in Fig. 51.

It is unnecessary to experiment upon children to ascertain the effect of deficient diets upon human dental arches. On every hand you will find children who have received or are receiving deficient diets, sometimes in the homes of the rich and sometimes in the homes of the poor. While there are striking exceptions, on the average you will find that diet-deficiency does for them just what it does for monkeys—either retards development or makes it impossible for it to go forward, so that arches in the nose and the throat are not properly developed. Sherman has conclusively shown that children of almost any age can be materially benefited by a diet which includes at least a quart of milk a day, and Chaney and Blunt have shown the great value of an orange a day in the diet. You might almost paraphrase the old rhyme:

An orange a day
Drives deficiency away.

Very truly yours,

Percy R. Howe

Porcelain Manipulation

A Practical Technic for the General Practitioner

By F. R. Felcher, D.D.S., Chicago, Ill.

VI

Shrinkage of Porcelain Bodies

The amount of feldspar in porcelain determines to a certain extent the fusing point of the body. Auxiliary to the feldspar is the flux used. The amount of condensation to which the porcelain is subjected by the operator during the building-up process also is a factor. Under ordinary conditions high-fusing porcelain will shrink about one-sixth of its bulk when condensed. Where lower-fusing porcelains are used, greater shrinkage must be expected. The lower the fusing point of the porcelain, the more the shrinkage that will result.

Since in this treatise we are interested in dealing only with the practical in order to produce definite results in the shortest possible time, we shall omit the description of the action of porcelains during the fusing process and the explanations that would of necessity accompany it. It is a foregone conclusion that all porcelain will shrink. If the porcelain is closely packed or condensed, the smallest amount of shrinkage will result. Porcelain shrinks in the direction of its greatest bulk. The greatest bulk in a jacket crown build-up is naturally the coronal portion of the crown. As the porcelain shrinks in the direction of the coronal portion of the crown, it will be noticed that there will be a drawing condition of the matrix at the shoulder. For that reason many porcelain operators relieve the shoulder, using different methods, and fill in the space before the second bake.

The author has noted that when a short apron of the platinum matrix was left beyond the shoulder of the die, and no relief was made to enable filling in subsequent to the first bake, a considerable space resulted after the matrix was removed. After experimenting for a while, it was found that when the matrix was sufficiently long over the shoulder, the drawing effect of the porcelain was interfered with, according to the length of the apron. Suppose that two teams of men, one composed of four and the other of three, were pulling against each other. It is reasonable to assume that under ordinary conditions the team of four would have the advantage, but add some support to the weaker team and it would be strengthened to the state of being either equal to or stronger than its opponent.

So it is with the matrix in relation to the shrinkage of the porcelain. Try it as an experiment either on a jacket case or on an inlay. Build up a matrix for either of the cases and allow the matrix to extend slightly beyond the shoulder or close to the cavity margins. Condense

closely, bring to a fuse, and strip the platinum. You will find that the porcelain does not fit at the shoulder or at the marginal walls of the inlay. Now build an apron that will extend at least two millimeters over the shoulder on the jacket preparation (Fig. 5) or about one to 1½ millimeters beyond the cavity walls of the inlay, bake up after thorough condensation, and note that there has been no action at the shoulder or at the cavity walls, but that the porcelain has merely shrunk. The amount of apron necessary to control the drawing at the shoulder or margins depends entirely upon the size of the work that is being built up.

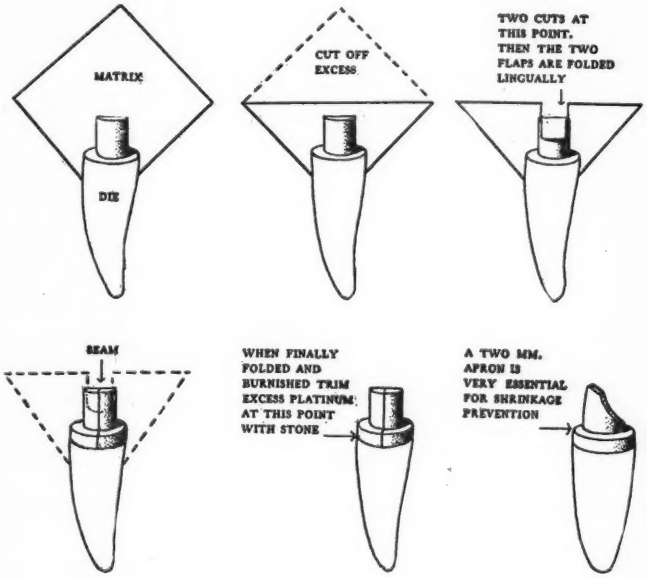

MATRIX
DIE
CUT OFF EXCESS
TWO CUTS AT THIS POINT. THEN THE TWO FLAPS ARE FOLDED LINGUALLY
SEAM
WHEN FINALLY FOLDED AND BURNISHED TRIM EXCESS PLATINUM AT THIS POINT WITH STONE
A TWO MM. APRON IS VERY ESSENTIAL FOR SHRINKAGE PREVENTION

Fig. 5

Steps in forming matrix for jacket crown.

It is not recommended to beginners, who are not completely familiar with the condensation procedure, to attempt to build crowns without relief at the shoulder. Where necessary to make relief for shrinkage at the shoulder, a simple way is to cut away with the carver as is described in the next paragraph. Some operators paint shellac at the shoulder of the matrix before applying the porcelain, while others build a bit of inlay wax at the shoulder. Each will of course burn out in the furnace and leave the shoulder clean. An easier and quicker method

is to cut away at the shoulder with the carving instrument after the crown has been built up.

Two bakes are recommended in jacket crown work, the biscuit bake, in which the shrinkage takes place, and the finishing bake. Sometimes one more bake is required. Allowance must be made for that by not bringing the earlier bakes too high. Porcelains must not be baked too many times, as overfusing the first applications of porcelain may result when the case is completed. Time is a vital factor in the fusing of porcelain bodies and must be considered when firing. This matter will be gone into fully in its proper place.

In the process of fusing, the feldspar and flux perform their work by uniting the kaolin, silex and the coloring materials into one mass. It must be assumed that when once it has performed the function that is required of it, it cannot be fused again without a deleterious effect on the fired porcelain.

7616 Phillips Avenue.

(*To be continued*)

CHICAGO, MAY 4, 1927.

It is fitting at this time to pause in the midst of a busy session to do honor to our friend, Dr. Nelville S. Hoff, who has recently gone to the Great Beyond. Dr. Hoff was one of our early, faithful and devoted members.

In his passing we have lost an esteemed confrère, one who was both teacher and friend, and a man whose counsel was sought by many.

Be it therefore resolved, that this Society record his passing, with sincere regret, and spread upon its minutes this token of our love and esteem.

AMERICAN SOCIETY OF ORTHODONTISTS,

HERBERT A. PULLEN,
MILTON T. WATSON,
Committee.

Peeso Removable Bridgework*

By Harry W. Rosalsky, D.D.S., New York, N. Y.

No attempt will be made in this article to cover the entire subject of the Peeso removable bridgework, but some new features in technic will be introduced which should be a decided aid to those utilizing this type of work and, if carefully studied, will be found to be a great improvement. Only the construction of the split pin and tube attachment and the telescope crown attachment will be described. No modifications will be discussed or referred to, and the basic principles of both attachments will be adhered to.

It has been erroneously stated that, in order to plan and engineer this type of bridgework, sound and normal teeth must be mutilated and pulps devitalized. This is one reason why this work has been condemned. But is it not worth while to sacrifice the pulps of one or two teeth where the stumps of three or four others remain that may be used as abutments to bridge a gap? In the majority of cases devitalization of normal teeth is unnecessary.

Good root-canal work is a paramount and most important feature of this work. Radiograms of the entire mouth are important, and also good study models.

The abutments of the smaller and single-rooted teeth are constructed first, so as to prevent any perforations of the roots. The split pin and tube attachment is utilized here, as it is desirable to show as little gold as possible.

Advantages of the split pin and tube attachment are as follows:

(1) Cleanliness, insuring health of the surrounding tissues.
(2) Protection of the tissues from the packing of debris, due to the lack of contact.
(3) Friction, depending upon the length of pin and tube.

The materials used and preferred are 28-gauge plate, high-fusing elastic half-round wire .002 larger than the tube, and tubes.

For the various successive soldering operations this series is followed, viz., coin gold, 22K, 20K and 18K solders. The practicability of this as compared with the sweating technic will be borne out later.

Construction of the Split Pin and Tube Attachment

The tooth is prepared as for any Richmond crown, the stump being cut down after trimming and fitting the band. In fitting the band, make sure that it has a slight taper toward the long axis of the tooth. The band is soldered with coin gold. Keep the stump 1/32 inch below the gum line on the buccal, and the same distance or more above the

* From a clinic before the First District Dental Society, New York, December 8, 1926.

gum line on the lingual, so that there will not be any pinching of the tissues between the inner cap and the floor or the three-quarter band. The band is now filed flat and burred with a small stone, and the floor is soldered with 22K as shown in Fig. 1.

The canal is enlarged with reamers, the tube being kept as far lingually as possible.

The cap is placed on the stump and marked where the tube is to be placed. The hole is then cut through slightly smaller than the tube and countersunk. This countersinking gives solder strength. The tube may now be soldered by either the direct or the indirect method. The indirect is preferable. An impression is taken with the cap in position, and the tube waxed to it. A mandrel is placed in the tube to hold its position in the plaster and to prevent the plaster from going into the tube. The impression is poured and the cap and tube soldered from this model. A test must be made for parallelism or the tapering of the sides toward the tube before soldering. A mandrel is placed in the tube,

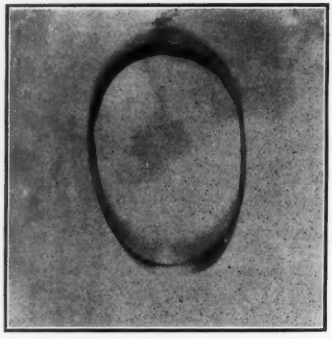


Fig. 1

and a flat instrument is passed around the walls. If there is any discrepancy, it may be corrected with files. 18K solder is used here. The lower grades of solder in the different soldering steps prevent the reflow of solder.

The cap is cleaned by boiling in 35% hydrochloric acid. The excess tubing above the floor is cut off and the floor filed flat. Remove all holes and irregularities. The entire cap is completely finished by filing with a No. 8 file and polishing. The cap is completed as shown in Fig. 2-A.

Fig. 2-B shows another band for wire measurements of the inner cap. This band is used for making a three-quarter band, which adds strength and incidentally gives greater friction for the split pin. A

metal die is made by inserting the cap into a ring filled with moldine and poured with Mellott's low-fusing metal.

The outer band is fitted over the inner cap by tapping the die into the band until a perfect fit is obtained. The soldered joint of the band is kept on the buccal in this case. The band is cut down to the same height as the floor of the inner cap. Two notches, as shown, are cut to prevent the solder from flowing to the labial of the band. A floor is made and soldered to the band, solder being fed on the lingual surface.

This is refitted on the die (with the cap). The position of the tube is shown on the floor of the outer cap if it has been well fitted. A

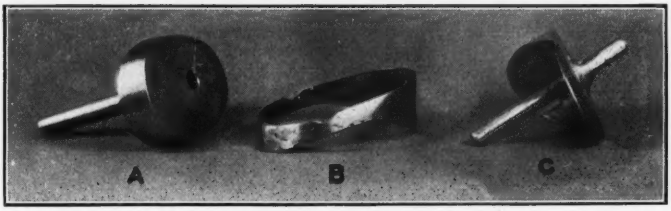


Fig. 2

Fig. 3

hole is made and countersunk, and the split pin inserted. The tube must be thoroughly cleaned.

The split in the pin must always run bucco-lingually, as the pin has greater strength in this position. The pin is lifted slightly out of the tube, to allow for tapping and refitting later, and is then waxed up and soldered.

The excess of the band from notch to notch is now removed with

separating disks, leaving a three-quarter band distolingually and mesially, then cleaned in acid and refitted. Gentle tapping may be resorted to by making a hole for the pin in thick lead plate and using this for a base. Figs. 2-C and 3 show the outer cap completed. (The construction of the split pin will be described later.)

The next step is the preparation of the stump for the telescope crown.

Making the Telescope Crown

The inner cap is placed in position on the stump of the smaller or anterior tooth, with a short mandrel in the tube. The stump for the crown on the molar is trimmed, the enamel cleaved and the stump tapered to a common center that will be approximately parallel to the mandrel of the inner cap. Any adjustment may be checked up on the model. The stump is cut out of occlusion, with allowance made for

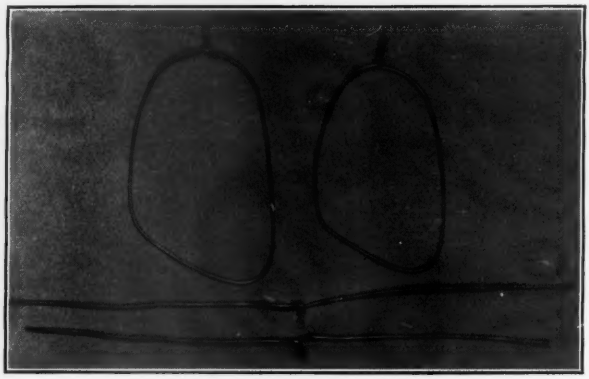


Fig. 4

two thicknesses of metal and a casting. Wire measurements are taken at the occlusal and cervical of the molar, as in Fig. 4. The metal is cut and soldered with coin gold having a carpenter's chisel edge for the lapping of the joint.

Fig. 5 shows the band much larger at the cervical than at the occlusal. The more the band is driven, trimmed and festooned, the more perfect will be the fit, so that a fine broach will not pass between the tooth and the band when in position. Spinning with a heavy burnisher will give a better fit at the cervical.

Fit the band to the stump and take an impression with the first attachment in position, including a short mandrel fitted to the tube. After the model is poured and articulated, check up the taper or

Fig. 5

parallelism of the anterior abutment and band. If any adjustment is necessary, it should be done now on the stumps in the mouth and refitted. Take another impression. The band is disked and cut down in preparation for soldering the floor (Fig. 6-A). Material for the floor must be absolutely flat and may be made so by placing a steel block on the anvil, with the metal in between, and tapping. Solder the floor to the band with 22K solder.

The inner cap of the molar is now finished by filing with a No. 8 file and burnishing, buffing and polishing. This is invested to make a

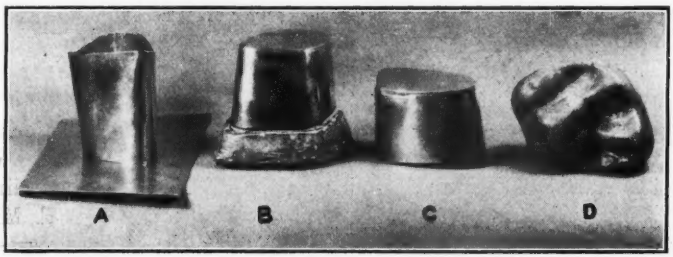


Fig. 6

metal die (Fig. 6-B). Any low-fusing metal, such as Mellott's, is used. Any method may be used, but embedding in moldine is preferred. This die is reproduced in moldine for a snap die to be used in making the band for the outer cap, so as not to mutilate the completed inner cap. Wire measurements are again taken of the inner cap. A band is made as previously described, but is fitted to the snap die to get the approximate shape and taper. Refit this to the inner cap and tap gently until all side surfaces will not permit the entrance of a fine broach. Difficulty will be found in trying to remove the band from the inner cap. Spinning with a large flat burnisher or tapping the die gently will always permit its removal. Follow the festoon of the inner cap and cut down the occlusal for the floor, leaving a slight excess for later tapping. Solder the floor with 22K solder and finish roughly (Fig. 6-C).

Replace it on the inner cap and tap it down until the floors meet. Always have rounded corners where the bands and floors meet.

The next step is making the wax pattern for the tooth restoration (Fig. 6-D). Two thicknesses of medium tin-foil are wrapped and burnished to the outer band as in porcelain work. This makes allowance for the contraction of the gold in casting. Restore the tooth form over the foil with inlay wax. Carve and occlude. Keep the wax short of the cervical margin, remove the foil carefully, invest and cast with coin gold. You will find that the inside of the casting will have to be touched up in spite of allowances made by the tin-foil.

Never cast directly to the outer band. The contraction of the metal will warp the band, and its fit to the inner band will be lost, destroying the friction and function of the inner and outer caps.

The casting is ground quite short on the lingual side for feeding the solder. Also cut a hole through the occlusal, thereby making sure of a good soldering. This also releases the imprisoned air. Any unsoldered portions may cause warpage. Clean the casting and outer band in acid. Place it in position and wax it up for soldering. Wrap thin wire around the casting and band from the mesial to the distal to prevent movement and interference with the feeding and soldering on the lingual. Invest, exposing to the flame only the lingual surface and the part of the occlusal surface having the hole, and solder.

Contour and finish with disks, then polish.

The pontic construction may be completed as desired. Tube teeth are preferable.

Figs. 7-11 show types of completed cases in various positions.

Fig. 12 is a photograph of a large model carved out of plaster with a bridge constructed of base metals used for demonstrations and clinics, 100 times as large as normal. I am indebted to Dr. Robert E. Miller for the aid given me in making this master model and the progressive steps for clinical purposes.

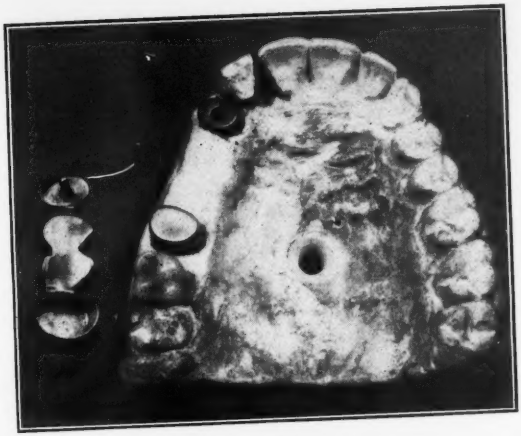


Fig. 7

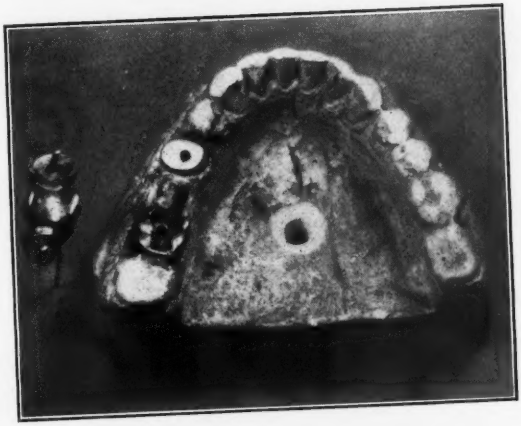


Fig. 8

Fig. 9

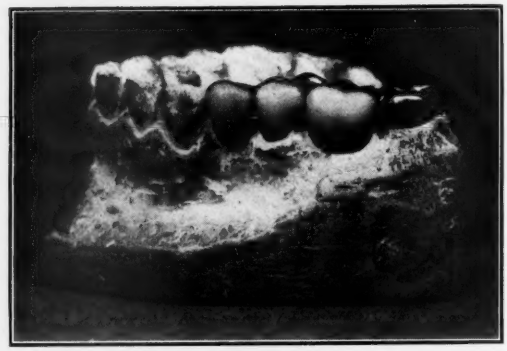


Fig. 10

Fig. 11

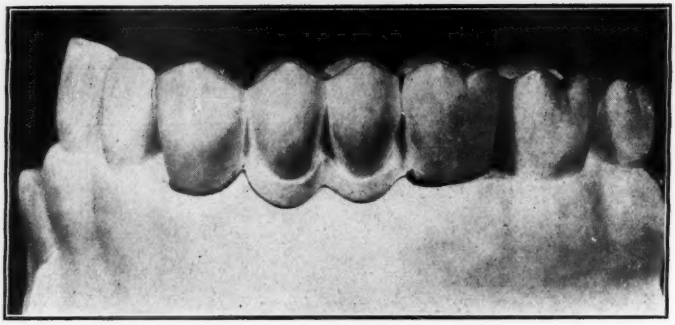


Fig. 12

Construction of the Split Pin

In Peeso work the hand-made split pin is indicated. It is cheaper and better and saves the time and trouble incurred in soldering.

Half-round, high-fusing elastic wire .002 larger than the tube is annealed and bent into the shape shown in Fig. 13-A. The open ends

are brought together and held in a pair of tweezers, and the loop is placed in a flame to remove the spring. A groove or slot is cut in a charcoal block for the reception of the wire, which is fluxed and soldered with coin gold. Watch the solder carefully and have no excess so that it flows into the loop and weakens the metal when forged. Fig. 13-B shows the pin correctly soldered; Fig. 13-C incorrectly soldered. Make a file mark 1/16 inch above the soldered portion of the pin. This gives a guide for placing part of the soldered pin 1/32 inch below the floor to prevent the flow of solder when soldered to the band and

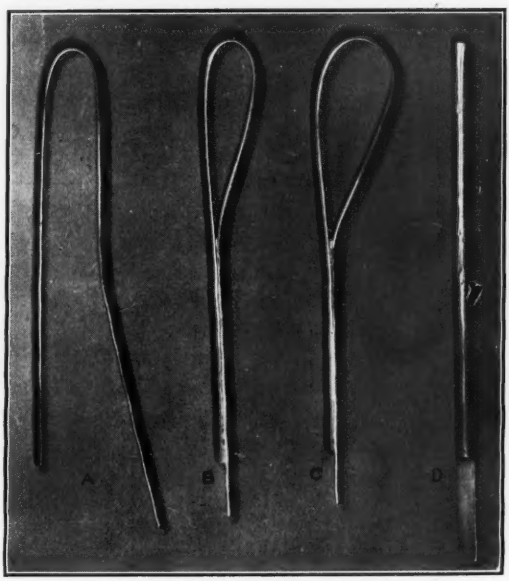


Fig. 13

coping. This is now placed in a chuck-vise and the loop end forged on a steel anvil. Forge, carefully rotating the pin so as not to flatten or distort it. The metal being .002 larger than the hole gives allowance for dressing down the pin to fit the tube, giving as great a friction as can be secured. Fig. 13-D shows the pin forged.

The dressing is done with a No. 8 file, emery paper and crocus cloth.

In dressing, place the pin in a motor vise and use a steel plate and file as shown in Fig. 14. Be careful when dressing not to secure a baseball bat effect. First dress the soldered end almost to a fit with files, which gives a guide of how much to dress. The balance is completed with the cloths. The final step is to use the burnishing side of a file. This gives a perfectly smooth pin that will not act as a file in the tube.

Fig. 14

The excess length of the pin is cut on a lathe by using the cutting end of a No. 3 file. This will not open the pin. Round the end with a fine file.

In conclusion, these types of removable attachments will be found to be of vital importance. While their use is limited, wherever they are used they will function exceedingly well, combining strength and esthetic appearance with the utilization of badly broken-down pulpless teeth.

239 Central Park West.

A Practical Study of Some of the Problems of Minor Oral Surgery

By J. Orton Goodsell, Jr., D.D.S., Saginaw, Michigan

(*Continued from August*)

Residual Roots

Radiographic examination frequently reveals the presence of residual roots, which are sometimes completely covered by bone and occasionally are deep-seated. It is obvious that without some definite technic for procedure it will be difficult to locate them, even when the radiogram apparently shows where they are. The presence on the film of a tooth near the root will assist in establishing the position of the fragment. As previously stated, the distance from tooth to root may be marked on an applicator or match-stick and then the stick transferred to the mouth and the opening incision made to take in the area over the residuum. If there are no teeth to be used as landmarks, there will always be some peculiarity of contour on the alveolar ridge which will show in the radiogram either mesially or distally to the root tip. This irregularity will be noticed both on the film and in the mouth. It may be merely an indentation or elevation of the mucoperiosteum, but it will invariably be present. The measuring, marking, and transferring of the stick to the mouth can all be done with this irregularity as a landmark, as well as with a tooth which shows externally.

An incision is now made in the mucoperiosteum, the tissue retracted, and burs, chisels, and rongeurs used to remove the covering layer of bone. When the root is located, it is removed and the tissue sutured back into place. In case the bone destruction is extensive, it is not advisable to close the soft tissue too tight over the osseous structure. An iodoform gauze pack should be inserted in the cavity and the end allowed to protrude through the incision. This should be replaced every 48 hours by fresh gauze until such time as the external opening will remain open by itself. The packs may then be discontinued and irrigation substituted as treatment until granulation has taken place in the bottom of the pocket. The sutures may be removed in a few days after the operation.

The blood clot which forms following extraction is the nucleus for new tissue and covers the bone and protects it. In view of this fact it is necessary that it should be preserved if possible. Violent irrigation and mouth washes, as well as sucking on the socket by the patient,

should be discouraged during the first day or two following the operation. Such carelessness may produce a secondary hemorrhage or cause the primary hemorrhage to continue, thus necessitating the use of packings or hemostatics. In many cases the clot will be lost or partially disintegrated by the oral fluids regardless of the precautions observed. This will permit the accumulation of food particles and extraneous matter in the alveolar pocket. If allowed to remain, such debris putrifies and produces irritation in the surrounding tissue and also forms media for organisms. Gentle flushing of the cavity with the aid of a syringe will prevent the retention of accumulations and assist in the healing of the wound.

Even following simple extractions the patient should be seen after an interval of two weeks, unless it is necessary to see him more often in order to determine whether normal granulation is taking place. At that time it can be seen whether there are detached spicula of bone to be removed which were not removed at the time of operation, or if any other condition requiring attention is present.

If the operation is one which would be apt to produce after-pain, the patient should be instructed to use a sedative for the relief of this condition. The writer has had very good success in combating after-pain by recommending the use of a capsule containing 3 grains of pyramidon and 5 grains of aspirin. These may be administered at the rate of one capsule every three or four hours. When the pain is so intense that sleep is impossible, rest may be induced occasionally by taking two or three sedative tablets before retiring.

Impactions

Impacted or unerupted teeth are frequently the cause of psychoneuroses, neuralgias, and other reflex nervous disturbances of obscure origin. They may also act as foreign bodies and produce cysts. These cysts are evolved from the submerged enamel-forming organ or follicle. Pockets around partially unerupted teeth are sources of infection and irritation and frequently act as foci of infection. Vincent's angina frequently uses this flap, following apparently successful treatment, as a haven and breeding place, only to break forth and invade the oral tissues when conditions permit. Unerupted or even malposed teeth not only are of no value themselves but very often cause the loss of what would otherwise be sound members of the dentition.

In view of these facts every effort should be made to secure the removal of all impacted teeth, even in apparently normal individuals. There is no object in waiting for trouble before operative interference is instituted. Furthermore, the patient and the surgeon will have a much easier task if the surgery is performed during the early years

of the patient's life and before the density of the bone and the adhesion of the peridental membrane form complications which make the extraction most difficult. Of course, there will be exceptions to the rule of uniform extraction of all impactions, but there is much more danger in permitting these teeth to remain than there is in their elimination. The removal of just *one* impaction which prevents the patient from having epileptiform seizures or insanity will amply repay us for all of those which we might remove from individuals who would never have any trouble. It is impossible to differentiate between those impactions which will or will not cause disease.

We will all agree that whenever specific disturbances are evidenced which may be attributed to unerupted teeth, we should make every effort to determine the presence or absence of such impactions. The fact that a dental radiographic examination does not reveal submerged teeth is no proof that such submersions do not exist. It is possible that they may be out of the range of a small film and can be found only by employing head and lateral jaw plates. Teeth are sometimes found in the ramus of the mandible, or at the angle, and also high on the tuberosity and even on the lateral wall of the nose or floor of the orbit. Large radiographic plates are the only means of revealing the presence of these impactions.

Nerve-blocking ordinarily will be preferable to general anesthesia in the removal of impactions. The position of the tooth will determine the method of removal. The ordinary mandibular third molar impaction, which shows a mesial presentation of the occlusal surface and a superior view of the distal surface, will be considered typical and a brief description of the technic of its removal will be given, as follows:

Two incisions are made, one running from the mesial to the distal over the impaction and one supero-inferiorly, starting at the gum line on the buccal of the second molar and extending downward for ¼ to ⅜ inch. The tissue is spread from the bone, exposing the osseous cortical layer. The occlusal bone is removed by chisel and surgical burs until the tooth is in sight. Now the distal and buccal plates are removed until it is possible to elevate the tooth bucco-superiorly without the exertion of too much force. The lingual plate will be either sprung or partially removed. If a fair amount of force is exerted and the tooth is not dislodged, it is apparent that there is some impingement of bone. This interference should be located and chiselled or drilled away and elevation tried again.

When the tooth has been released, the cavity should be cleaned of all loose spicula of bone and the soft tissue sutured back into place. Iodoform gauze should be inserted through the occlusal incision, and dressings changed every 48 hours until the opening will maintain itself. Thereafter frequent irrigations to secure the removal of for-

eign material should be substituted for dressing changes. It is well to continue this practice for two or three weeks. When dressings are being changed, it is advisable to remove the gauze and immediately insert the fresh pack, at the same time preventing the flow of saliva into the pocket.

This same technic, with modifications, will apply to all impactions. The chief assets lie in obtaining the proper access and vision, in removing the covering bone with speed and precision, and in care in after-treatment. Application of 2% to 10% mercurochrome solution is used as a part of the after-treatment.

Cysts

We are all familiar with various types of oral cyst, especially of the radicular or root type, which occurs at the apices of teeth with dead pulps and is caused by degenerative liquefaction of granulomatous areas with peridental epithelial tissue as the cell wall. However, it is well to appreciate the fact that there are other oral cysts which are not radicular but are known as multilocular and dentigerous follicular types.

In making a preoperative diagnosis it is well not to be too positive, for in this way we may avoid the embarrassment which naturally would follow if a simple cyst should turn out to be something else when viewed by the pathologist in his laboratory. Incidentally, all cysts or growths which are not absolutely typical clinically should be sent to a pathological laboratory for diagnosis.

Oral cysts must be differentiated from carcinoma, sarcoma, and antral empyema. The radiogram will form one of the most definite means of diagnosis. Radiograms of cysts will show a very definite wall about the central area of destruction. If the cyst has attained large dimensions, it may cause a bulging of the bony wall. This wall may be so thin that it has the crackly feeling of heavy wrapping paper when palpated.

The contents of cysts which are uninfected and not purulent will be straw-or dark-colored fluids, which may or may not contain glistening cholesterin crystals. These will all be contained within an epithelial wall, which is generally quite thick.

Radicular cysts, as a rule, are the slowest growing of oral cysts and are most common.

Multilocular cysts, sometimes known as *adamantinomata,* are etiologically the result of the proliferation of epithelial cells, which are the remnants of primary epithelial cords. This explains their presence in the center of bone, which apparently has no epithelial contact. As the name implies, there are occasionally many ramifications of the

cyst, the different bodies of which are connected but are almost shut off from each other by trabeculae of bone. For this reason they are more difficult to remove, as the operator may miss one of the offshoots from the central body. The consistency of the adamantinoma is generally more solid than that of the other types and of a hardened jelly-like nature, with some fluid. The multilocular cyst is the least common of the oral cysts.

The dentigerous cyst is produced by a proliferation of the follicle of an erupting or unerupted tooth, the wall or base being composed of this tissue and the central area having fluids and possibly cholesterin crystals.

The general treatment of all these cysts is the same. Successful prognosis depends upon the complete removal of the cell wall or epithelial lining in its entirety. All ramifications should be followed out in order to insure their complete enucleation. All edges of bone should be removed and the margins carried back so that the soft tissue may collapse against the bone. Iodoform gauze drains should be inserted and changed and rechanged every 48 hours until drainage and ventilation of the very floor of the cavity is maintained by itself. This compels granulation to take place from the bottom. After the gauze dressings have been eliminated, regular irrigations should be made and the area often observed to make sure that the ventilation is being maintained. This should be continued until complete granulation has taken place.

Plastics for Plate Construction

Varying degrees of protrusion of the maxilla or the mandible sometimes call for surgical interference in order to make satisfactory dentures. In these cases it can readily be seen that an esthetic and well-fitting denture cannot be made unless some tissue is removed. There is nothing so unsightly as the appearance of an individual who very evidently shows that his teeth are not his original ones, and whose countenance reveals a large area of vulcanite. This can be avoided in many cases by proper plastic surgery of the mouth. The operation to remedy this condition is, briefly, as follows:

An incision is made through the mucoperiosteum all along the alveolar ridge and the soft tissue is elevated labially, thus exposing the bone. Rongeurs and surgical burs are used to remove the buccal bone and carry it back as far as it is desired or it is possible to carry it. Discretion must be used and the removal of too much bone avoided. The irregular edges of bone are now smoothed down with chisels and curets, and the soft tissue moved back into place and held there by several sutures. The tissue should not be placed under tension. If

a great deal of bone has been removed, there may be an excess of soft tissue when closing the incision. If this is the case, a triangular piece of soft tissue may be removed on either side in the bicuspid region and the tissue approximated.

In mouths which have supported dentures over a long period of time we occasionally find large bodies of soft tissue which either are hypertrophic or are proliferations following bone absorption from plate pressure. These can usually be removed by scissors. Sometimes it is necessary, however, to excise an elliptical piece of soft tissue and suture the remaining margins together.

Once in a while we find such extensive absorption of alveolar bone that we could almost say that none existed. By this it is meant that the osseous structure has so receded that the mucous membrane from the palate or floor of the mouth extends straight across to that of the cheek, leaving little or no bucco-alveolar membrane. It can readily be seen that dentures are impossible with this condition existing. The writer has been using the following operation for the past few years as a remedy for this condition, when it is desirable to construct dentures:

A horizontal incision which runs from molar region to molar region is made through the mucous membrane, *but not through the periosteum.* The line of incision is about 1/8 inch buccally from the alveolar ridge or, in other words, it is just over the edge of the maxilla or the mandible. The membrane is now carefully elevated and separated from the periosteum. Sutures are employed to invert and carry up the mucous membrane and fasten it to the muscular tissue which has been exposed, and it is retained in this position. Granulation now takes place, and a new muco-buccal fold is formed and at the same time produces a new ridge over which to place a denture.

Osteomyelitis

Organisms producing osteomyelitis in the maxilla may enter from the nose or sinuses, from the general blood stream, or from infections about the teeth. The portal of entry of sepsis in the mandible, of course, would not be in the sinuses. The chief prophylactic procedure in jaw infections would be the prevention of caries and gingival irritation, thus eliminating the teeth as causative factors.

Occasionally an osteomyelitis will develop or, rather, appear following the extraction of a painful tooth. Thus it may seem that the tooth produced the sepsis. Of course, it is difficult to determine whether or not this is the case, but if the tooth had the appearance of being intact and normal clinically, it is probable that the infection came from the blood stream, and that the osteomyelitis was the cause

of the pain in the tooth rather than that the tooth was the cause of the sepsis. In this connection it might be mentioned that it is well for the operator to be cautious and somewhat reticent regarding the prognosis following the extraction of all painful teeth. We should not promise that as soon as the tooth is removed everything will be all right, because, if we do this, we shall occasionally find ourselves embarrassed by the continued presence of infection and pain.

In an osteomyelitis that is beginning, or one that is exacerbated and draining improperly, we may have the syndrome of intense pain, swelling, and fever. The organism is generally a virulent streptococcus. A culture from the area will assist in the diagnosis.

Dr. V. P. Blair, in discussing osteomyelitis, quotes the Italian proverb: "He who goes slowly goes safely and he who goes safely goes surely." This advice to be cautious has no greater application anywhere in the realm of surgery than in the treatment of new or even old cases of osteomyelitis. Sedatives and either hot or cold applications should be used to keep the patient comfortable while waiting for the infection to point. After it is evident that drainage can be established, an opening should be made and maintained. Active curettage should be carefully avoided and all instrumentation limited to gentle exploration and removal of sequestra as formed.

When establishing drainage in the jaws, the incision should be made in the soft tissue over the alveolar ridge or, if necessary, externally under the inferior margin of the mandible. The tissue is retracted and the sequestra removed. Overhanging edges of bone or involucra should be rounded off to enable the soft tissue to fall into the pocket. Sharp corners should be eliminated. The first sequestrum will usually be formed in one to three months, and the operation described above performed at that time. If we give plenty of time for the formation of the sequestrum, new bone will be forming to replace the old and deformity will not take place.

When the time for operation arrives, the procedure should be bold and thorough and all sequestra should be elevated and removed as previously described. If necrotic areas are encased by involucra, the bone should be chiselled away and the decayed bone eliminated. Iodoform gauze drains should be inserted and changed at least every 48 hours for several days following the operation, or until it is assured that drainage will take place by itself. Here again it is well to be careful with promises to the patient, as it is not at all impossible that the same operation will have to be repeated in a few months.

In concluding the discussion of osteomyelitis the writer wishes to re-emphasize the absolute necessity of avoiding active curettage at all times and of inhibiting any desire to operate radically upon discovery of the infection.

Jaw Fractures

Attempts at the reduction of jaw fractures should not be made without adequate knowledge of the anatomy of the parts, muscular forces involved, and complications that might arise. This may be said of *any* branch of surgery, as far as that is concerned. Therefore, on account of lack of space and time to consider the details of anatomical structure and classification but brief consideration will be given to this phase of oral surgery.

Best results are obtained if the fracture is reduced immediately after injury. If this cannot be done, the jaws should be supported by a figure-eight bandage until such time as operative procedure can take place.

When teeth are present, interdental ligation with 23-gauge bronze wires will prove most satisfactory. If the mandible is the only jaw fractured, this will probably be all that is necessary, but if the maxilla is separated in continuity, the use of a leather chin-and-head strap or plaster cast must be made. In the latter case interdental ligation may be superfluous.

Interdental ligation is accomplished as follows:

Bronze wires are placed around each of the teeth to be ligated, the ends being twisted together. The fracture is then reduced and the teeth brought together in proper occlusion. The wires on the mandible are then twisted tight with those of the maxilla in a criss-cross fashion, i.e., the wire from the mandibular second bicuspid is engaged with that of the maxillary bicuspid, that of the mandibular first bicuspid with that of the maxillary first bicuspid, etc.

Metal splints of various types are at times of considerable advantage.

A short time ago the writer reported the use of a soft vulcanite splint in the reduction of fractures of edentulous jaws. Since that time he has had occasion to try out this type of splint further and is convinced of its merit under certain conditions. It is a modified Gunning splint, the modifications being that of composition rather than of form. It is made of soft rubber rather than of hard vulcanite such as is used in denture construction. Considerable pressure is exerted by a head-and-chin strap when employed in immobilizing and holding a mandible and a maxilla in a Gunning splint. This force or pressure is transferred to the mucoperiosteum covering the alveolar ridge. It has been the writer's experience that the membrane cannot stand the pressure when driven against a hard splint, and that it *can* tolerate a soft one, which will give retention. Further experimentation with this appliance may cause its discard, but at the present time it seems to be superior to the other types of splint.

Another type of Gunning splint molded from black impression tray

modeling compound is sometimes of value in edentulous jaw fractures. This compound is very hard and does not lose its form when retained in the mouth. It can be rapidly made by being molded in the mouth right after the injury. The jaws are supported, as before, by chin straps or plaster casts. Three to five weeks are ample to assure sufficient calcification of the provisional callus.

Edentulous jaw fractures are immobilized with difficulty, unless circumferential wiring is used. It is the writer's opinion, however, that it is better to attempt the use of a Gunning type of splint than to bring wire into contact with the bone. In the latter case there is more of a possibility of bone infection. This results from the seepage of oral fluids around the wires.

Angina

The spirochete of Vincent's angina is a facultative anaerobe, which shows a preference for anaerobic media but will grow under reduced oxygen tension. However, a large amount of oxygen is inhibitive to its growth. The use of arsenic preparations, which are more or less spirochetal specifics, augmented by the use of some oxygen-liberating drug, is the logical procedure in combating this destructive disease.

The following treatment has been used by the writer for several years, with uniform success:

A piece of loosely wrapped cotton is saturated with Bowman's solution (equal parts of liquor potassium arsenite and wine of ipecac) and held on an applicator or cotton pliers. The saliva is ejected from the mouth and the cotton held over the gingivae. The drug and cotton are then forced into the pockets around and between the teeth with the point of a small curet or excavator. A firm wiping motion should be used, as it is desirable to remove the pabulum and promote a hemorrhage, which as a general rule it is not difficult to produce. In cases where great destruction has taken place the interproximal spaces will be filled with debris. The cotton should then be run completely through from buccal to lingual, or vice versa. It is useless merely to paint the tissues with the solution, even though we are tempted to do so by the extreme tenderness of the gingivae. The cotton should be changed frequently, perhaps fifteen or twenty swabs being used in the treatment of a mouth at one sitting. If this procedure is rigidly adhered to, exceptionally good results will be obtained and the cases which are not relieved from pain within twenty-four hours will be the exception rather than the rule. At the outset treatment should be given daily and, to prevent recurrence, should be continued at intervals for several weeks after a cure has apparently been accomplished.

The office procedure which has just been described is very ably assisted by the home use of a mouth wash composed of one-half grain

of mercury bichlorid dissolved in two ounces each of distilled water and fresh hydrogen peroxide. The patient should be instructed to agitate the solution in his mouth, forcing it between the teeth and holding it for a moment or two before expectorating. The expectoration is essential, of course, because of the toxicity of the mercury bichlorid. This mouth wash should be used two or three times daily. The "boiling" of the peroxide increases the amount of free oxygen and also assists in the removal of the gingival debris.

The question of diagnosis should come before that of treatment, but in this case it seems to the writer to be of such importance as to receive the emphasis of the last position in this paper

Angina is not difficult to diagnose if the proper care is taken and the laboratory is used to full advantage. The chief thing from which it must be differentiated is syphilis. A patient presenting with angina-like ulcerations should have cultures and smears made and a Wassermann taken. Dark field examination of the organisms also should be made. This procedure may seem rather superfluous, especially in view of the fact that angina can usually be diagnosed clinically, but the experience of having one's angina patient turn out to be luetic is not an impossibility unless these precautions are observed. One cannot always depend on the syphilitic lesion to follow its usually painless course, for it is sometimes complicated by secondary infections. If the above-mentioned diagnostic care is exercised, not only will syphilis and angina be allocated, but other forms of ulceration and stomatitis will be recognized as well.

Instrumentation should not be part of the treatment until the acute stage of the infection has passed. However, it is essential to follow up these cases by thorough oral prophylaxis. The removal of partially erupted teeth, thus eliminating pockets which might serve as a retreat for the organisms, should be made a part of the prophylactic procedure, as well as the removal of calcific deposits.

Miscellaneous Suggestions

In conclusion, the writer asks permission to insert a few miscellaneous thoughts and suggestions which did not seem to have any particular place in the previous discussion.

We all have a horror of the broken needle which becomes lost in the tissues. The possibility of this accident may be minimized by the use of nickel or platinum needles, and by refusing to insert the needle beyond a point ¼ inch from the hub. Frequent changing of needles prevents erosion and lessens the likelihood of breakage. The writer frankly admits that he knows of no definite technic for removing embedded needles. Radiograms should be taken from all possible angles in order to determine the position that the needle occupies and

then during the "big hunt" one should attempt to avoid forcing it any deeper into the tissues. It is most exasperating at times to possess radiograms showing "exactly where the needle is" and then have difficulty in locating it. Patience and good fortune are the two chief requisites in the quest for the lost needle.

Another accident which none of us particularly desires is the loss of a root in the antrum. This is apt to occur to any one, and the only sin in this connection is to refuse to take it out one's self or to refer the patient to some one who will remove it. Frequently the supposedly lost root may not be in the antrum at all, but is between the antral epithelial lining and the bone. A little patience, self-control, and poise, together with a little "fishing," will extricate the lost fragment. However, if the root is in the antrum, it should immediately be removed. A horizontal incision is made in the mucous membrane, at a point about ¼ inch above the gingival margin and running from the lateral incisor to the first or second molar. The tissue is reflected from the bone and an opening made into the sinus through the canine fossa. This opening should be large enough to insert a diagnostic lamp into the cavity and also permit the insertion of a pair of cotton pliers. The root should be easily found and removed. The tissue is now sutured back in place and the occasion will be rare when an untoward result from the antral invasion will occur. If the root is allowed to remain in the sinus and the matter is kept a secret, untold discomfort and sinusitis may be the result, and only the accidental discovery of the foreign body by some oral surgeon or otolaryngologist will relieve the distress of the patient.

Block anesthesia will assist in the diagnosis of tic douloureux or trifacial neuralgia and obscure pains emanating from the mouth and jaws. Anesthetization of different nerve trunks may serve to locate the nerve irritation and limit the field of possible causes to one definite branch.

There is the old adage: "Do not put off until tomorrow that which you should do today." This has direct application to most phases of oral surgery, both major and minor. We are apt to procrastinate and try to avoid our problems as they confront us. When you are in the midst of a difficult extraction and are beginning to lose composure, do not send the patient home with instructions to return later and have the extraction completed! When we have just extracted a tooth and discover a cyst, we should not send the patient away without first enucleating the mass! When a patient has a mouth that requires surgery as a preliminary to denture construction, let us tell that patient what he needs and not make a misfit appliance! In other words, let us do today that which is imperative for today.

501 Second National Bank Building.

Special Teeth for Cross-Bite Cases

By Alfred Gysi, D.D.S., Zurich, Switzerland
Professor of Prosthetic Dentistry, University of Zurich
(Literary Collaboration of George Wood Clapp, D.D.S.)

FIFTH ARTICLE

BALANCE IN NATURAL AND ARTIFICIAL DENTURES

The prosthetist desires to make artificial dentures that will be natural in appearance, stable in position, comfortable in use and efficient in mastication. He can do this only if properly formed teeth are available to him and he understands how to arrange them. Artificial teeth can be properly formed only by application of a knowledge of the conditions under which they must function. Merely by doing as he is told, the dentist can arrange such teeth to be fairly satisfactory with only a very limited knowledge of the conditions, but that is not the method by which professional progress has been achieved. It will be worth while to supplement the short study of resorption that has been made by a brief description of some of the characteristics of fine natural dentures, of the movements of the mandible in mastication and of the forces to which artificial dentures are subjected in the mouth.

Natural dentures in which the positions of all the teeth are perfect are very rare. I know of only two regions where such dentures may be found, one in Switzerland and one in Germany. Both are mountainous and all of the living conditions are very primitive, including the facilities for cooking. Except for milk and cheese the principal articles of food are bread, which is baked hard with a very thick, strong crust and may be more than a week old when eaten, and air-dried beef, which is very tough. The people, mostly shepherds, are of leisurely habits and devote plenty of time to the long and forcible mastication required to put such food in condition to be swallowed. This mastication forces the teeth into practically perfect alignment so that there is balancing contact in every movement of the mandible, except when the teeth are separated. Only among such people is to be found the ideal arrangement of the teeth which nature probably intended to be normal for all people. When the young people who have been brought up in these regions under such conditions go to the cities at the age of eighteen or twenty and take places as domestic servants, their teeth become carious within two or three years and are soon lost because they know nothing about their care and preservation.

There are other reasons why balance by the molars during the incising bite is not more frequently found in adults, but few persons in highly civilized communities eat a sufficient quantity of really hard food or devote to the foods they do eat a sufficient amount of force in

mastication to form perfect dental arches. Few indeed are the children in such communities who are given hard food during the years when the teeth might be aligned by it.

As a result of faulty diet and mastication, the deciduous molars must often be extracted, on one or both sides, before the time for the eruption of the permanent molars, and the first permanent mandibular molar then erupts in a position which makes ideal articulation impossible. One of the functions of the first permanent molars is to establish a proper height of the dentition, but if these are extracted on one or both sides before the second molars are firm in position, the incisors will not be able to maintain the height of the bite. So much overjet of the maxillary incisors will result that the position of the molars and the height of the cusps will not be sufficient to maintain balance of the dentures in the molar region during the incising movement.

Because healthy natural teeth are firmly supported in the bony structures, and because they are forced by the mandibular movements and worn by contact to positions and forms which do not interfere with such balance of the dentures as the individual is capable of, natural

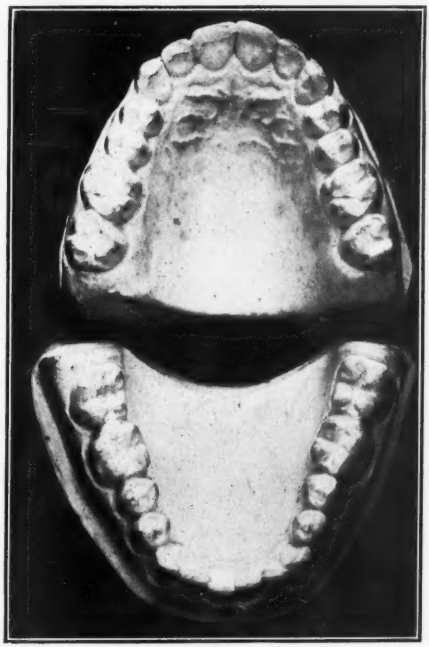


Fig. 29A

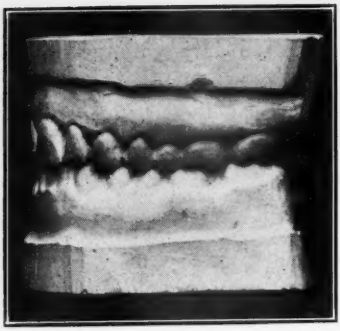


Fig. 29B

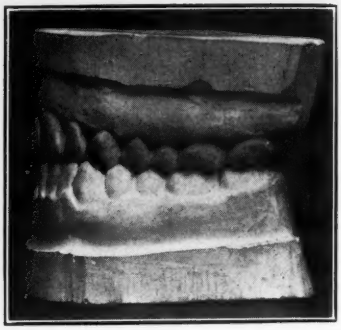


Fig. 29C

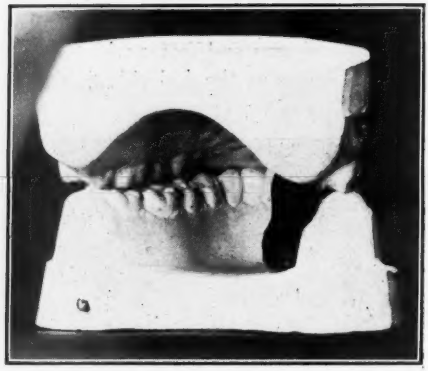


Fig. 29D

Fig. 29

Natural dentition of a soldier from Canton Wallis, Switzerland, shown by the courtesy of Dr. François Ackermann, Geneva, Switzerland.

A—Occlusal view.

B—Lateral view of the occlusion.

C—Working bite as the casts were moved by hand. This is probably at least the limit of function in mastication, and here the interdigitation of the opposing edges and cusps is quite as perfect, from centrals through the second molars, as I have ever contended for in artificial dentures.

D—Balancing relation as seen from the rear and at one side. The lingual cusp of each maxillary tooth is in balancing contact with the buccal cusp of a mandibular tooth. This relation was brought about by the thorough mastication of liberal quantities of hard bread. Such a relation is unusual because of soft food and insufficient mastication, but it is evidently the ideal toward which nature strives, and for which we also should strive.

dentures are reasonably efficient even when there is no molar balance during the incising movement. The natural dentures of the regions mentioned, in which there is perfect balance during all movements of the mandible, are capable of an efficiency in mastication that is quite impossible to dentures in which there is no such balance. The force exercised by these people in mastication, which is greater than the average natural denture is capable of, does not produce pyorrhea because it is well distributed throughout all the teeth. The character of the food and the thorough mastication keep the teeth self-cleansing and they do not decay.

My former assistant, Dr. François Ackermann, has casts of natural dentures (Fig. 29) from the Swiss regions spoken of which exhibit every principle of balance in all positions of the mandible, for which I have been contending for a long time.*

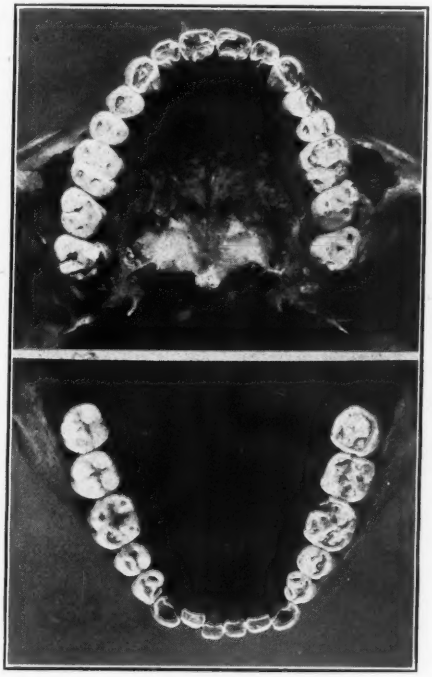


Fig. 30A

* W. S. Heermans, D.D.S., has recently found the skull of an American negro, who died in 1927, which exhibits a similar balance in all positions of the jaw. Pictures of this skull are shown as Fig. 30.—G. W. C.

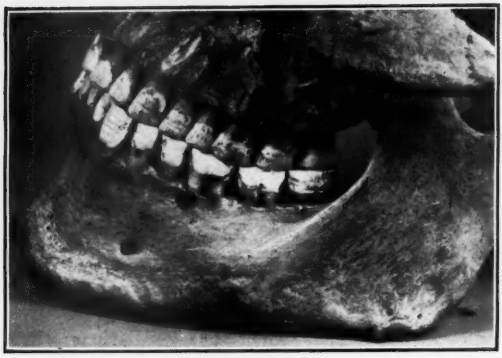


Fig. 30B

Fig. 30C

Fig. 30

Dentition from a modern negro skull, New York, 1927.

A—Occlusal view.

B—Working bite. Nothing is known about this man's dietary habits, but the teeth have worn each other into perfect balance in this relation from centrals to third molars.

C—Balancing bite. Note the firm contact of the three maxillary molars with the two mandibular molars. This is much more than merely the three-point contact for which some authors have contended.

Balance in Artificial Dentures

Natural dentures in which there is no balance during mandibular movements are fairly satisfactory as long as they last, but artificial dentures that are to offer the maximum masticating efficiency must balance during all mandibular movements with the teeth in contact and must be so formed as not to be easily dislodged by food between the teeth during the ordinary movements in mastication. Such teeth can

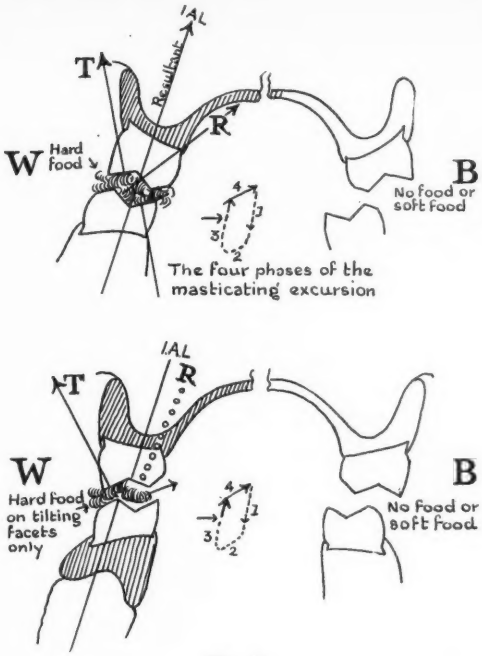


Fig. 31

W—Working bite. T—Tilting force.
B—Balancing bite. R—Retaining force.
I A L—Interalveolar crest line.

The most unfavorable condition under which teeth can work. Food on one side only.

UPPER ILLUSTRATION

The teeth are well set, so that there is balancing contact when the teeth are in central relation. There is hard food on the working side only and no food or soft food on the balancing side. It is here supposed that the bolus is of uniform density, so that the force transmitted through the food is distributed equally over the entire surfaces of both teeth. The resultant of the tilting and balancing forces takes the direction of the line here marked *Resultant*. This is in the interalveolar crest line, and both dentures are held in place on the ridges.

LOWER ILLUSTRATION

Normal-bite molars badly arranged so that there is no balance in lateral movement when no food is between the teeth. They are here shown in the third phase of the masticatory excursion, during which food is crushed.

The escape of food to the lingual is so much easier than the escape to the buccal, as the teeth are here arranged, that the food between the lingual cusps is quickly washed out and cannot exercise the retaining force that it should. The food, which is more closely held on the buccal, exercises a tilting force on the upper buccal cusp in the direction of the line T, which is unfavorable to stability because it falls outside the base of the denture.

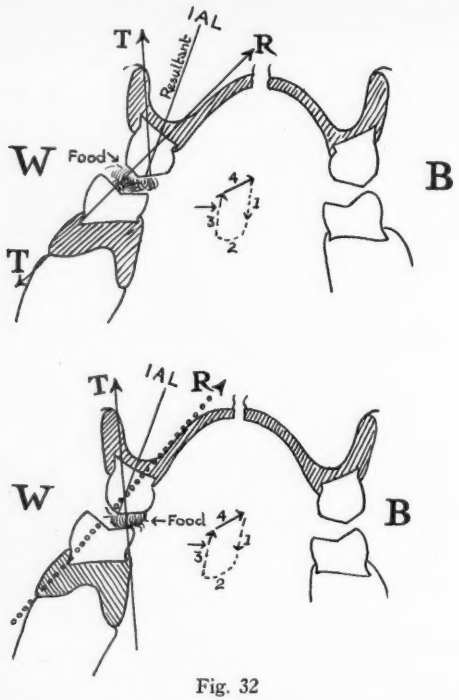


Fig. 32

The most unfavorable condition under which teeth can work. Food on one side only.

UPPER ILLUSTRATION

Cross-bite teeth are here shown near the end of the third phase of the masticating excursion. Food of uniform density is between the teeth on the working side. The pressure from the food is equally distributed over the tilting and retaining facets of the teeth. The tilting force takes the direction of the line T and does not fall outside the base of the denture. The retaining force takes the direction of the line R and falls far inside the denture. The resultant of these forces takes the direction of the interalveolar crest line. Even when there is no food on the balancing side, the maxillary denture will not be tilted out of position.

LOWER ILLUSTRATION

It may happen that food will be held between the tilting facets, and that there will be no food between the balancing facets. Even when the maximum tilting force is exerted, it will fall so far inside the base of the denture that the denture will not be tipped out of position, even when there is no food on the balancing side.

The general conclusion from Figs. 31-32 is that, even under such unfavorable masticatory conditions as will dislodge a well set denture with normal-bite teeth, the use of cross-bite teeth will stabilize the dentures and will merely require of patients more frequent masticating movements, because the teeth are of smaller area and are of such form that food escapes easily from between them.

be made by applying the principles found in ideal natural dentures to the formation of artificial teeth, with such changes in tooth form as are required by the different conditions under which the artificial dentures function.

Tilting and Retaining Forces

Much is said about tilting forces in connection with the illustrations which immediately follow. It should be understood that when artificial dentures are so well articulated that there is practically perfect balance in all positions in occlusion, the tilting forces are balanced by the retaining forces on both sides as long as the teeth are in contact.

When the normal-bite teeth are articulated with the proper difference of level between the buccal and lingual cusps on both sides and they are separated with a bolus of hard food on the working side and no food or only soft food on the balancing side, the tilting force on the working side is practically counteracted by the retaining force on the same side. (Fig. 31, upper illustration.) The resultant of these two forces probably then takes the line of the long axis of the teeth and the bone of the alveolar ridge so that the denture will not be tilted out of position.

But when the artificial normal-bite teeth are not perfectly articulated, with the proper difference of level between the cusps on both sides, it may occasionally happen that a bolus of hard food gets between the tilting facets on the working side. In this position of the teeth the line of the tilting force will be directed far outside the base of the denture. If any retaining force is exerted on the working side, it will be feeble as compared with the tilting force. With no food or only soft food on the balancing side the strong tilting force cannot be balanced and the denture will be tilted out of position. (Fig. 31, lower illustration.) Under the same unfavorable circumstances the cross-bite forms of artificial teeth are less likely to produce tilting forces. (Fig. 32.)

(To be continued)

Togo's "Discursions"

Mr. Editor of Defrosted Magazine Devoted to Inside Job of Tooth Fix:

Hon. Sir:

Delirious Science of Dentistry now consists of wide variety of problems too numerous to mention with vast accumulations of evidence pointing to probability that conditions of bewilderment and uncertainty now existing in mind of Hon. Average Practitioner of D.D.S. degree will perhaps grow considerably worse before improvement is noticeable.

Consider from safe position on side lines following debilitating facts:

Only trifling years have elapsed since statements were freely promulgated by ambidextrous authorities that only safe root fillings were those going exactly to or joyfully through end of Hon. Root. Only such were of sufficient safety to permit retention in mouths of near Human Beings in which they were supposed to be customarily inserted. Papers with lantern slides, case histories, testimonials and other etc. were profusely submitted in support of statement that slight shoe button or mushroom effect at tip of all root ends was sufficient evidence that Hon. D.D.S. who did so was 100% O. K. pulp canal artist with ringside ticket to all desirable events about to take place in Great Hereafter, if any, safely sewed on collar of operating jacket.

All pulp canals were to be enlarged while patients' bank balances proportionately contracted during delightful but prolonged process of mushrooming all root ends. (Memorials were in some instances established and generously subscribed by the profession at large to keep alive Hon. Memory of one chief canal enlarger and bank account reducer.)

During activities just enumerated various small town practitioners of considerable perspicacity and powers of observation might be encountered at all large Dental Society Meetings holding small group conferences in Hotel Lobbies or other inexpensive meeting places and earnestly comparing notes on actual results of root canal treatment as practiced by themselves in the Old Home Town. Quite frequently men in such group were of frank and friendly nature, not active competitors in same community, and therefore considerable honest observation was placed on the air for benefit of whoever was of open mind and teachable disposition.

During these heart to heart talks of Dirt Farmer Dentist following groundwork of experiences was very apt to be sketched in and agreed upon, to wit:

Hon. Tooth containing perfectly straight and friendly pulp canal terminating in only one opening at apex is extremely rare specimen. Upper centrals showing highest percentage of such delightful qualifica-

tions; at opposite end of extreme difficulty were most molars whose roots are of forbidding shape and diversification so that proper pulp treatment is entirely removed from realm of reasonable endeavor by any merely Human Agency—thank you! Such group at that time of recently elapsed years might have contained slightly undersized Gentleman of shirking nature who perhaps would venture hesitating remark to general effect that he considered complete and exact removal of entire contents of Hon. Pulp Canal and substitution of filling of any sort exactly to end of root matter of supreme difficulty, seldom exactly accomplished by mere human being even after most exhausting efforts to do so had been indulged in; said shirking gentleman might also have ventured observations that, based on his own personal practice and rather extensive examination of x-ray negatives, there existed no fixed and definite ratio between troubles present at apices of teeth with roots filled to end or beyond and teeth with roots only partly filled or not filled at all; if urged by innocent bystanders to continue his remarks he might even go further and offer to produce extensive series of x-ray negatives so arranged that only slight tip of each root appeared for observation and then offer cash reward to any one who could correctly state in case of 50% of such pictures which if any contained living or long dead pulps at time picture was made.

For many years the shirking gentleman here alluded to enjoyed extremely lonely feeling at all Dental Meetings, being unable to forget his own personal experience and observation along lines just noticed and equally unable to harmonize such experience and observations with the high-brow theories and statements with which he found himself almost completely surrounded wherever Hon. Essayist and three Discussers were gathered together on Program touching this subject.

Strange occurrences appear to be taking place, Mr. Editor, for Research Results seem now tending to show that maintenance of approximate health on part of pulpless tooth is dependent on several things most of which our inoffensive and retiring friend recognized from clinical experience as prominent and pertinent facts but which he had no Scientific ability to explain or give reasons for.

First: Integrity and continuity of apical tissues must be preserved if possible; which is reverse English of statement that no destructive drugs or other deleterious substances must be forced through apex into surrounding tissues at any time.

Second: Permanent safety of tooth containing root filling of any sort seems to depend chiefly on healing process which goes on around end of root from outside sources and thus cuts off further disasters arising from late residence of pulp when present.

While it is perhaps of considerable importance to have pulp entirely

removed and canal properly filled exactly to apex and all foramina closed, permanent integrity of apical tissues and safety of Hon. Tooth is by no means entirely dependent on such measures.

Steady improvement shown during recently elapsed years in manner of constructing excellent bridges of great efficiency and satisfactory sanitary features leads to conclusion that in many cases involving deceased pulps in molars and bicuspids it is practice productive of more lasting friendship between dentist and patient if former will painlessly remove said pulpless posteriors and accept suitable fees for installation of modern bridges with completely vital teeth as abutments.

Prospect of doing pulp canal operations on molars and bicuspids of either jaw of quality of exalted excellence which will justify retention on basis of results actually attained is too remote to be considered by intelligent dentist of 1927 model.

Hoping you are the same,

TOGO.

[MAN IS A MOTOR]

Just as an automobile, if it only has plenty of gasoline of good quality in its tank, will plow through the mud, climb the mountains, splash across the fords, and jolt over the rocks without once losing its headway, so the man-motor—the human body—if well and abundantly fed, can make its day's march through life without weariness, conquer the hardest task of work with positive enjoyment, and shake off the attack of infectious disease. We are embodied sunlight, and we eat that sunlight in the form of food.

—HUTCHINSON.

PRACTICAL HINTS

This Department is now being conducted from the office of The Dental Digest. To avoid unnecessary delay, Hints, Questions and Answers should be addressed to Editor Practical Hints, The Dental Digest, 220 West 42d Street, New York, N. Y.

NOTE—Mention of proprietary articles by name in the text pages of THE DENTAL DIGEST is contrary to the policy of the magazine. Contributions containing names of proprietary articles will be altered in accordance with this rule.

Editor, Practical Hints:

I should appreciate some information. My Baby, four years old, with tonsils and adenoids removed and slightly under weight, grinds his teeth at night loudly.

Physicians are unable to diagnose the case. Information will be appreciated.

R. R. G.

ANSWER.—This is not an infrequent occurrence with young children. It is probably due to habit or irritation, possibly from indigestion. There is nothing to do for it, I think, but to build the child up physically as best you can. It is usually not persisted in over a long period of time.

The child will probably outgrow the habit anyway, but he will do so more quickly if the general health is speedily brought to normal. —V. C. SMEDLEY.

Editor, Practical Hints:

Will you kindly give me information in the following matter?

I am practicing in a town several thousand meters above sea level and expect to use nitrous oxid in my practice. Do you consider that the altitude will have any ill effects on its administration or will alter in any way the general behavior of gas and patient?

P. C.

ANSWER.—Altitude seems to have no effect, one way or the other in the administration of nitrous oxid. It is administered in Leadville, Colorado, which has an altitude of over 10,000 feet, with as great

success as at sea level. The well-known physiologic effect of nitrous oxid makes it clear and reasonable that this would be the result.—G. R. WARNER.

Editor, Practical Hints:

I have a patient with inflammation of the gingiva and mucous membrane, with little white spots or patches inside the lips and roof of the mouth. They are very sore. This is accompanied by bad tonsils and sore throat. Does one condition lead to the other?

Please give me some simple treatment for this, especially to eradicate the spots.

J. S. I.

ANSWER.—Your patient has a case of what seems to be vesicular stomatitis, which is very likely due to the infection in the tonsils and throat.

Any of the well-known mouth washes are helpful, and if you will touch the ulcerated spots with a cotton-wrapped toothpick dipped in a saturated solution of trichloracetic acid, it will immediately take the soreness out and the healing process will start.—G. R. WARNER.

DENTAL SECRETARIES and ASSISTANTS

Secretaries' Questionnaire

All questions and communications should be addressed to Elsie Pierce, care of THE DENTAL DIGEST, 220 West 42nd Street, New York City.

NOTE—HAVE YOU A BETTER WAY? HAVE YOU A TIME-SAVING SHORT CUT? DO YOU KNOW A "STUNT" THAT LIGHTENS THE WORK OR MAKES FOR EFFICIENCY IN THE OFFICE? IF SO, WRITE TO ELSIE PIERCE, CARE THE DENTAL DIGEST, 220 WEST 42ND ST., NEW YORK. YOU MAY HELP A NUMBER OF GIRLS WHO ARE JUST BEGINNERS—AND YOU KNOW HOW YOU NEEDED HELP DURING YOUR FIRST FEW MONTHS IN A DENTAL OFFICE. OR IF YOU NEED HELP NOW WRITE TO ELSIE PIERCE—SHE'LL HELP YOU.

In the July issue of THE DENTAL DIGEST we published an inquiry regarding schools for dental assistants and secretaries and the courses given therein, and our reply. Since that time we have received the following information from the Dean of the School of Dentistry, Medical College of Virginia, Richmond, Va.:

"A course of this nature is being started in the Medical College of Virginia, School of Dentistry, during the coming session."

No doubt this is good news to the dental assistants who have been hoping for the establishment of such courses in the recognized dental schools of this country. If our readers who are interested will write for a catalog giving the particulars of this course, we have no doubt that they will receive it, as well as any other information they may seek.

Dear Miss Pierce:

In the July issue of THE DENTAL DIGEST appeared a question about the best way to remove modeling compound from an impression tray. Your answer was good, but I believe that an easier and quicker way is to place the tray in a jar containing chloroform for about 30 minutes, more or less, depending on the amount sticking to the tray, and then wipe it clean with a cloth. Chloroform will kill all germs.

Dr. G. W. M., Minnesota.

We appreciate this suggestion and hope it will help our readers. It is encouraging to receive such assistance from a member of the dental profession.

Dear Miss Pierce:

I am interested in the work of a dental hygienist, but I know nothing about the course. Could you send me some information on the subject or tell me where to send for literature concerning schools, the cost of the course, and any other requirements or details?

C. Y., Iowa

ANSWER.—Each month we receive a number of such inquiries from dental assistants and others. We hope that the following data will enable those who are interested to secure the information they desire.

There are at the present time eleven schools for dental hygienists, as follows:

Forsyth-Tufts, Boston, Mass. Director, Dr. Harold DeW. Cross.
Columbia School of Dental Hygiene, New York, N. Y. Director, Dr. Anna V. Hughes.
Rochester School of Dental Hygiene, Rochester, N. Y. Director, Dr. H. J. Burkhart.
School of Hygiene, University of Pennsylvania, Philadelphia, Pa. Director, Dr. J. E. Aiguier.
School of Dental Hygiene, Temple University, Philadelphia, Pa.
School of Dental Hygiene, Northwestern University Dental School, Chicago, Ill. Director, Dr. F. B. Rhobotham.
School of Dental Hygiene, University of Michigan, Ann Arbor, Mich. Director, Dr. H. E. Hartwig.
School of Dental Hygiene, Marquette University, Milwaukee, Wis. Director, Dr. H. L. Banzhaf.
School of Dental Hygiene, University of Minnesota, Minneapolis, Minn. Director, Dr. Leonard.
School of Dental Hygiene, University of California, San Francisco, Cal. Director, Dr. G. S. Millberry.
School of Dental Hygiene, University of Tennessee, Nashville, Tenn. Director, Dr. R. S. Vinsant.

Dear Miss Pierce:

I always read the *Questionnaire* and should like a little advice. I should like to know what the average salary is for a dental assistant. Of course I realize there are a great many things to be considered, so I shall give you an idea of what I do in my respective position, which I entered upon my graduation from high school some three years ago.

The dentist I work for is one of the best dentists in this section, our town has a population of 4,000, our patients are called in every six

months, and we average eight patients a day, so you see we are always busy. I go to the office at 9 A. M., my lunch hour is from 12 to 2, then I work until 6 P. M., or until the last patient leaves. I plan all the appointments, make out and send the necessary cards, take care of the bookkeeping, banking, and everything around the office, except the filling of teeth and repair jobs, but I sometimes help to set up teeth.

Every summer the doctor takes a vacation of six weeks. I am forced to take it whether I wish it or not. During this time I look after all the mail which may come to the office, but I do not receive one cent of salary, and my weekly pay is $12.00. I generally have half a day off each week, but when there is a holiday, I have to work the whole of the following week to make up for it. I have reached the point where I cannot afford to go on this way any longer. I am going to ask for a raise, also two weeks' pay while on vacation. I take an interest in the office and the doctor even admits to his patients that I can mix a porcelain filling better than he can. Of course I do not expect so much as one who has taken a special course in hygiene, but I have learned by several years of experience, and experience is the best teacher.

I think I deserve more than I get. What do you think about it?

X. Y. Z.

We publish this letter with the thought that it will be of interest to many of our readers, and we shall be glad to receive any comments thereon.

Books Received

A BOOK MAY BE AS GREAT A THING AS A BATTLE—DISRAELI

Pyorrhea Alveolaris, Its Etiology, Pathology, Symptoms, Sequelae and Treatment, by F. St. J. Steadman, D.P.H., L.R.C.P. (Lond.), M.R.C.S., L.D.S. (*Eng.*), Dental Surgeon and Lecturer on Dental Disease in Children, Local Anesthesia and Bacteriology, Royal Dental Hospital; Dental Surgeon to West London Hospital; Late Dental Surgeon and Lecturer on Dental Histology, National Dental Hospital; Dental Surgeon to the Metropolitan Hospital and the Belgrave Hospital for Children.

Dr. Steadman divides pyorrhea into three classes, all of which are attributed to local causes. He does not consider the theory that it may be a local manifestation of a systemic condition. But if he does not believe this, he seems thoroughly convinced that every sort of ailment, from insanity to acne, may be due to pyorrhea. In regard to the former he quotes at great length from the writings of Dr. Cotton, whose deductions have not been universally accepted by the medical profession in this country. Nevertheless he brings home with emphasis the importance that oral conditions play in the economy of the body.

The author states that the disease is alarmingly prevalent, and that from the very earliest possible time preventive measures should be instituted to ward off its occurrence. Bottle-feeding, adenoids, mouth-breathing and malocclusion are certain predisposing factors, and the diet should be regulated along the lines advocated by Sim Wallace.

The section on treatment—and it is a small one—is unsatisfactory. There is a short chapter on instrumentation, and ionization and ultraviolet radiation are recommended, but one cannot but feel that he considers extraction to be the only sure and safe procedure.

There is much to criticize in this book, according to the viewpoint of the majority of men in this country, but there is also so much of real value that one hesitates to do so. The reviewer could not recommend it for use by the student, but the experienced practitioner could read it with profit.

263 pp., with 42 illustrations, 36 plates, and index. St. Louis, Mo.; The C. V. Mosby Company, 1927.—A. M. J.

Practical Pedodontia, or Juvenile Operative Dentistry and Public Health Dentistry—An Introductory Text for Students and Practitioners of Dentistry—by Floyde Eddy Hogeboom, D.D.S., Instructor in Pedodontia, College of Dentistry, University of Southern California; Former Member, Childrens' Hospital, Los Angeles; Former Member, Health and Development Department, Pasadena City Schools.

The value of this book is attested by the fact that it is in its second edition, and it also shows the interest that is being taken in that most important part of dentistry—pedodontia.

First, there is given a brief survey of embryology, with special reference to the development of the child's head. Then follows a short description of cavity preparation, and a discussion of filling materials. One chapter is given over to the first permanent molar and another to the treatment of pulps in deciduous teeth.

The author agrees that diet and nutrition underlie the problem of dental caries and he sets forth the elements of a proper diet. The final chapter on *Public Health and Dentistry* shows the difficulties that are encountered in establishing a dental clinic and some of the ways in which they may be overcome.

This book, as stated on the title page, is an introductory text or an outline, but it nevertheless contains much that is of interest and of value to those who wish to make a specialty of pedodontia.

108 pp., with 77 illustrations and index. St. Louis, Mo.; The C. V. Mosby Company, 1927.—A. M. J.

FUTURE EVENTS

A competitive examination for appointment to the DENTAL CORPS OF THE U. S. NAVY will be held September 19, 1927, at the U. S. Naval Medical School, Washington, D. C. Appointees must be citizens of the United States, between 21 and 32 years of age at the time of appointment, which may be one or two months later than the date of completion of the examination.

Applications to take the examination should be made in accordance with a form which may be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., and must be accompanied by certificates of birth and citizenship, of graduation from an accepted high school or the equivalent and from a recognized dental school, and two or more letters testifying to good habits and moral character.

The examination will be both theoretical and clinical and the usual duration is from seven to ten days. No allowance can be made for the expense of persons appearing for examination.

E. R. STITT,
Surgeon General, U. S. Navy.

THE MASSACHUSETTS BOARD OF DENTAL EXAMINERS will hold an examination for registration for both dentists and oral hygienists in the City of Boston, Mass., October 17-19, 1927. Full information, application blanks, etc., may be secured at the office of the Secretary, Room 146, State House, Boston. All applications must be filed at the office of the Secretary at least ten (10) days before date set for said examination.

W. HENRY GRANT, Secy.

THE FEDERATION OF AMERICAN WOMEN DENTISTS will hold its sixth annual meeting in Detroit, Mich., October 24, 1927. Women members of the American Dental Association are welcome.

GRACE ROGERS SPALDING, Pres.,
423 Maple Avenue, West,
Birmingham, Mich.

MARY B. MEADE, Sec'y,
Carmi, Illinois.

THE ALPHA OMEGA FRATERNITY will hold the pre-convention meeting of its Supreme Council on Monday, October 24, 1927, at the Savoy Hotel, Detroit, Michigan, which will be followed by a dinner for all attending fraters. Those expecting to attend should notify Dr. J. T. Rothner, 8786 Linwood Avenue, Detroit.

A new directory is to be published. The full name of each member, address and school with class year is requested.

ALVIN H. BERMAN, Supreme Chancellor,
A. M. FLASCHNER, Supreme Scribe,
419 Boylston St., Boston, Mass.

THE AMERICAN DENTAL LABORATORIES ASSOCIATION will hold its Sixth Annual Meeting at Fort Wayne Hotel, DETROIT, MICHIGAN, October 24-25, 1927.

THE AMERICAN DENTAL ASSISTANTS ASSOCIATION will hold its Third Annual Meeting at Detroit, Mich., October 25-27, 1927. General headquarters will be at Hotel Savoy, where all sessions will be held, and reservations should be made promptly. Railroad fares are at convention rates on the certificate plan. All dental assistants are cordially invited to attend this meeting. Dental assistants' societies not affiliated with the American Dental Assistants Association are asked to send representatives. For further information, address

MAUDE SHARPE, *General Secretary,*
Suite 1202, 8 West 40th St., New York, N. Y.

THE STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY OF NEW JERSEY will hold its regular examinations at Trenton, N. J., commencing December 5, 1927, and continuing for five days thereafter.

The license fee is $25.00; reexamination fee, $10.00.

Practical tests required: Insertion of an approximal gold filling, with the approximating tooth in position; compound approximal amalgam filling and a silicate filling, the candidate to furnish his own patient. Taking of impression, bite, selection of teeth, articulation and trial plate, the candidate to furnish his own patient. Practical examination in mouth diagnosis.

Attention is invited to the following quotation from the dental law of New Jersey: "Applicant shall present to said Board a certificate from the Commissioner of Education of this State, showing that before entering a dental college he or she had obtained an academic education consisting of a four-year course of study in an approved high school or the equivalent thereof."

In accordance with this law, the secretary will issue application blanks only upon presentation of the required certificate from the Commissioner of Education, State House, Trenton, N. J.

Application must be filed, complete, ten (10) days before the date of examinations.

Address all communications for further particulars to

JOHN C. FORSYTH, Sec'y,
148 West State Street, Trenton, N. J.

THE FIRST DISTRICT DENTAL SOCIETY, NEW YORK, announces its third *Better Dentistry Meeting* to be held at the Hotel Pennsylvania, New York, N. Y., December 5-7, 1927.

In conjunction with this meeting a dinner will be tendered Dr. William Dwight Tracy in recognition of his contribution and unselfish devotion to the profession.

Detailed information will be published later.

THE CHICAGO DENTAL SOCIETY will hold its 1928 annual meeting and clinic at the Drake Hotel, Chicago, January 24-28. This year's feature will be a three full-day meeting as compared with the two and a half day meeting heretofore.

An excellent program is assured by the chairman of the Program Committee, Arthur D. Black.

HUGO G. FISHER, Secretary.

THE AMERICAN SOCIETY OF ORTHODONTISTS will hold its next annual meeting at Hotel Statler, Buffalo, N. Y., April 30-May 3, 1928. Members in good standing in the American Dental Association are cordially invited to attend.

WALTER H. ELLIS, President,
CHARLES R. BAKER, Sec'y-Treas.,
708 Church Street, Evanston, Ill.

THE DENTAL SOCIETY OF THE STATE OF NEW YORK will hold its 60th annual meeting at Syracuse, N. Y., May 16-18, 1928.

A cordial invitation to attend is extended to all ethical dentists who are members of State Societies. The Society also bids all ethical Canadian dentists a very cordial welcome.

For information with reference to literary exercises, clinics, etc., apply to Dr. A. P. Burkhart, Secretary, 57 East Genesee Street, Auburn, N. Y.